



MITSUBISHI
ELECTRIC

Changes for the Better

for a greener tomorrow

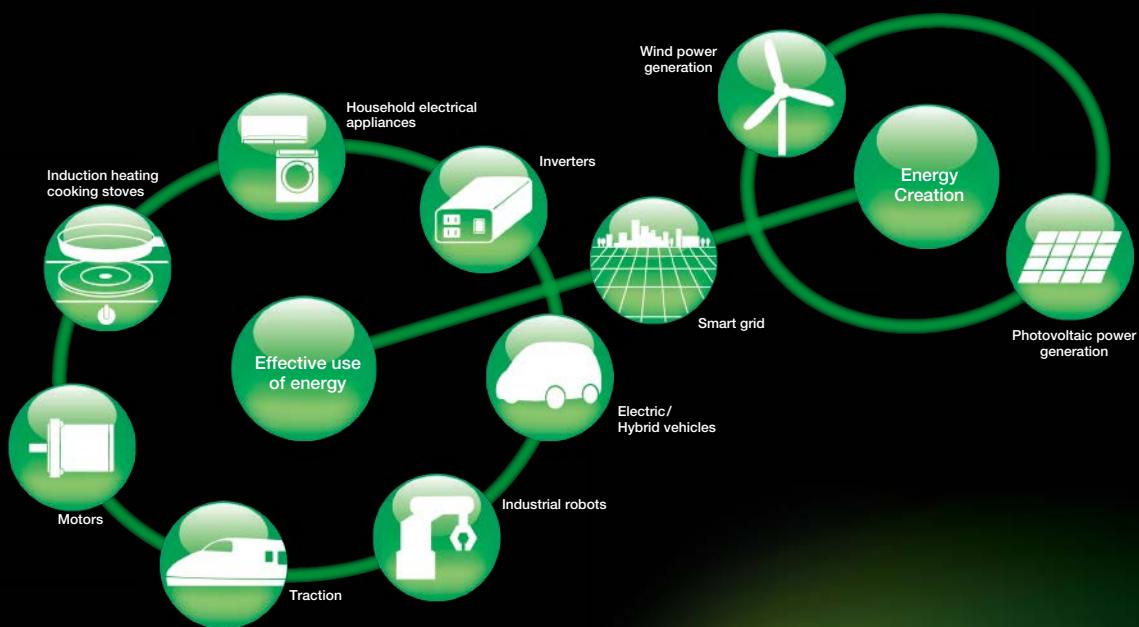


POWER MODULES

Power Modules

Innovative Power Devices for a Sustainable Future

Mitsubishi Electric power modules are at the forefront of the latest energy innovations that seek to solve global environmental issues while creating a more affluent and comfortable society for all. Some of these innovations are photovoltaic (PV) and wind power generation from renewable energy sources, smart grids realizing efficient supply of power, hybrid/electric vehicles (HVs/EVs) that take the next step in reducing carbon emissions and fuel consumption, and home appliances that achieve ground-breaking energy savings. Whether in appliances, railcars, EVs or industrial systems, our power modules are key elements in changing the way energy is used.





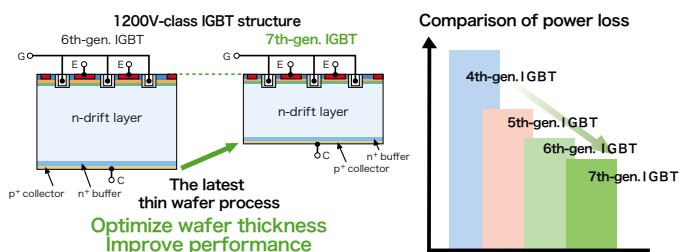
Focus Technology

7th-Generation 1,200V-Class IGBT Chip Technology

Cutting-edge technology realizes energy-saving inverter devices

- Latest thin-wafer processing (n-drift layer) achieves thinner wafer than 6th-generation devices
- Performance improved by combining CSTBT™* and light punch-through (LPT) structures
- Inverter system power dissipation minimized by its superior performance(lower $V_{CE(sat)}$ and E_{off})

*CSTBT: Mitsubishi Electric's unique IGBT that makes use of carrier cumulative effect



A small surface mount package IPM has been newly developed for fan and low-power motor drive applications

Key Features

- Optimal pin layout realizes easier PCB wiring design and enables smaller PCB size
- Newly integrated interlock function in addition to conventional protection features for robust operation
- Bootstrap diode is integrated for the P-side drive power supply like conventional DIPIPM™ series, reducing the number of peripheral



Modules realizing single-control power supply and photocoupler-less systems for household appliances and low-capacity inverters

Key Features

- Transfer-molded structure incorporating a high thermal conductivity insulation sheet provides heat
- High-voltage IC equipped with drive, protection and level-shift circuits for direct control via input signals from a CPU or microcomputer
- Compact board and highly reliable equipment realized through single power-supply and photocoupler-less systems
- Includes built-in bootstrap diode (BSD)



Modules with built-in control and protection circuits for AC servo robots and PV power generation

Key Features

- Built-in protection circuits for short-circuiting, power supply undervoltage and overheating
- Highly compatible package with simplified printed circuit board (PCB) design
- Special intelligent power modules (IPMs) for power conditioners in PV power generation systems



IGBT modules for general-purpose inverters used in various applications

Key Features

- Various low-inductance packages and power chips available
- Compatible with high-frequency, high-voltage (1,700V) applications
- Large-capacity modules available for renewable energy systems



High voltage, large capacity and high reliability are realized for traction and power transmission application

Key Features

- Two types of package are realized: "std type" with large output power and "LV100/HV100 type" for various inverter capacity by easy parallel connection
- The abundant field experience more than 20 years especially in the application of bullet train
- High reliability due to a long lifetime design and a robust design against severe environment



Modules realizing high performance and reliability for propulsion inverters in HVs/EVs

Key Features

- Built-in temperature analog output function realizing highly reliable drive train
- High-power/temperature cycle life ensures high reliability
- Compliant with the End-of-life Vehicles Directive, regulations relating to substances of environmental concern
- High traceability in managing materials/components throughout the entire production process for each product



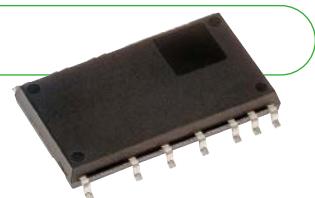
Surface mount package IPM



New Products

Surface mount package IPM MISOP™

SP1SK, SP1SL, SP3SK and SP3SL



A small Surface mount package IPM has been newly developed for fan and low-power motor drive applications

<Main Features>

- Optimal pin layout realizes easier PCB wiring design and enables smaller PCB size
- Insulation distance between pins ensured, realizing easier board mounting without coating process
- Newly integrated interlock function in addition to conventional protection features for robust operation
- Installing RC-IGBT¹ simultaneously realizes compact package and low loss performance can go together
- Bootstrap diode is integrated for the P-side drive power supply like conventional DIPIPMTM series, reducing.

¹1 Reverse-conducting IGBT

Type name	Current ratio	Voltage ratio	Chips	BSC	Protection	Shape
SP1SK**	1A	600V	RC-IGBT	-	UV	Surface mount package
SP1SL**			HVIC×1	Embedded	SC	
SP3SK**			LVIC×1	-	OT	
SP3SL**			BSD×3	Embedded	VOT IL	

[Term] VOT: Analog temperature output

★★:Under development

UV : Power supply under-voltage protection

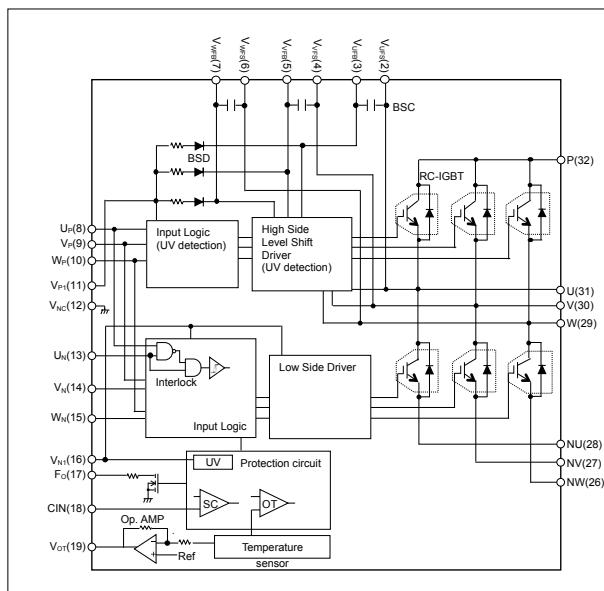
SC : Short-circuit protection

OT : Over Temperature protection

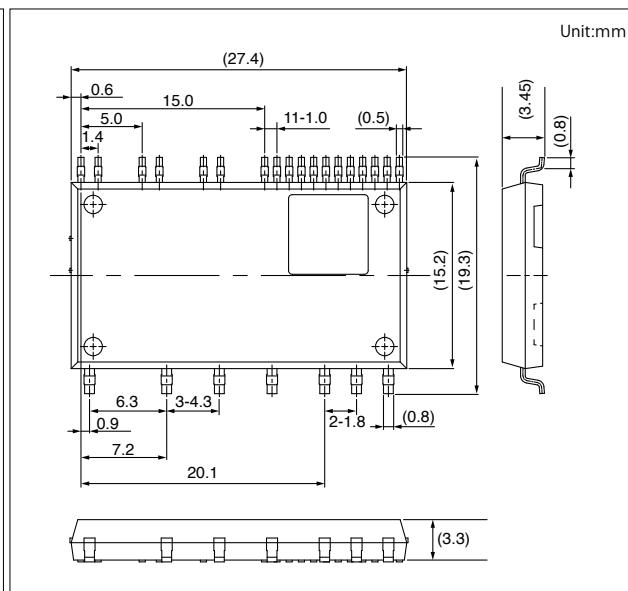
IL : Inter Lock

BSC : Bootstrap capacitor

Schematic drawing



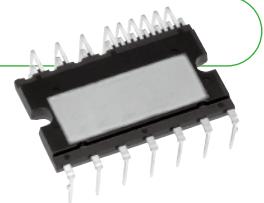
Outline Drawing





Feature Products

**Smaller package size realized by integrating newly designed RC-IGBT
Recommended for low-cost inverter and fan controller applications**



SLIMDIP™ SLIMDIP-S, SLIMDIP-L

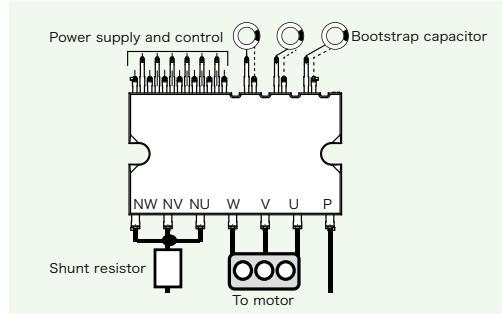
<Main Features>

- RC-IGBT¹ incorporated, reducing package size 30% compared to Super-mini DIPIPM
- Maximum case temperature increased from 100°C to 115°C, increasing the operating temperature range and leading to easier system design
- Additional terminals for floating supply and built-in bootstrap diodes simplify PCB wiring pattern
- Both VOT² and OT³ functions integrated for temperature protection

*1 RC-IGBT: Reverse conducting IGBT

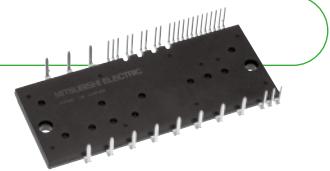
*2 VOT: Temperature information output function

*3 OT: Over-temperature protection function



Feature Products

All-in-one intelligent power modules equipped with 3-phase converter and brake circuit in addition to inverter circuit



DIPIPM+™

PSS05MC1FT, PSS10MC1FT, PSS15MC1FT,
PSS25MC1FT, PSS35MC1FT, PSS50MC1F6

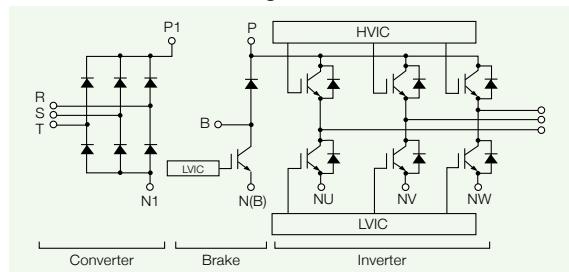
<Main Features>

- Encapsulated with transfer molded resin, integrates three-phase converter, inverter, brake and control IC
- Built-in converter and brake enable system size to be reduced and save design cost, contributing to total cost reduction
- Lower PCB inductance pattern reduces noise, thereby reducing design time and countermeasure parts required for noise reduction
- Built-in BSD¹ with 1,200V withstand voltage reduces number of external parts and improves reliability

*1 BSD: Bootstrap diode

*2: Available without brake circuit

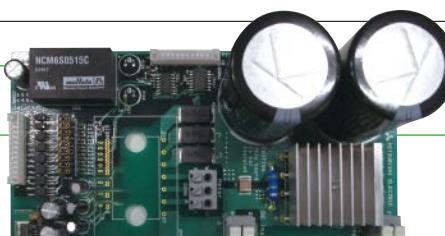
Internal circuit diagram



Customer Support

EVA series, evaluation boards for each DIPIPM™

Various evaluation boards to easy support system design



SLIMDIP™ evaluation board
EVA01-SLIM



SLIMDIP™ evaluation board
EVA15-SLIM



Super mini DIPIPM™
evaluation board
EVA11-SDIP



DIPIPM+ evaluation board
EVA14-DIP+



DIPIPM+
evaluation
board
EVA03-DIP+

* For further information, please contact sales office.

Line-up of DIPIPM™

■ Series Matrix of 600V / 500V DIPIPM™

V _{CE(S)} (V)		600V					500V	
I _C (A)	Series	SLIMDIP	Super mini	Mini	Large	CIB/CI	Super mini	
			Ver.6		Ver.4	DIPIPM+	MOSFET	
3	SLIMDIP-S SLIMDIP-L							PSM03S93E5-A
5		PSS05S92F6-AG PSS05S92E6-AG	PSS05S51F6 PSS05S51F6-C					PSM05S93E5-A
10		PSS10S92F6-AG PSS10S92E6-AG	PSS10S51F6 PSS10S51F6-C					
15		PSS15S92F6-AG PSS15S92E6-AG	PSS15S51F6 PSS15S51F6-C				PSM15S94H6-A	
20		PSS20S92F6-AG PSS20S92E6-AG	PSS20S51F6 PSS20S51F6-C PSS20S71F6				PSM20S94H6-A	
30		PSS30S92F6-AG PSS30S92E6-AG	PSS30S71F6					
35		PSS35S92F6-AG PSS35S92E6-AG						
50			PSS50S71F6	PS21A79	PSS50MC1F6 PSS50NC1F6 *5			
75				PS21A7A				
Chip	IGBT/MOSFET	RC-IGBT	CSTBT	CSTBT	CSTBT	CSTBT	SJ-MOSFET	MOSFET
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake part	P-side/N-side	P-side/N-side
	SC	N-side	N-side	N-side	N-side with sense	N-side	N-side	N-side
	OT	N-side	N-side*1	—	—	—	—	N-side
	VOT	N-side	N-side*1	N-side	N-side	N-side	N-side	—
Specifications	Active input	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(5V)	High(3/5V)	High(3/5V)
	Emitter pin of N-side	Open	Open	Open	Open	Open	Open	Open
	Fault output	N-side(UV,SC,OT)	N-side (UV,SC,OT)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC,OT)
	Insulation voltage	2000Vrms	1500Vrms*2	2500Vrms	2500Vrms	2500Vrms	1500Vrms*2	1500Vrms*2
	Insulation structure	Insulation sheet	Insulation sheet	Molding resin*4/Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	Compliant	Compliant	Compliant *3	Compliant	Compliant	Compliant	Compliant
	Pin type	Control side of zigzag (Long, Short)	Long	C: Control side of zigzag None: Short	—	—	Long	Long

[Notes] *1 : PSSxxS92E6 has OT function, PSSxxS92F6 has V_{OT} function

*2 : AC60Hz,1minute. Corresponds to isolation voltage 2500Vrms
in the case the convex-shaped heat sink

*3 : High melting point solder (Lead Over 85%) is used
for chip soldering of PSSxxS51F6 only.

*4 : Molding resin insulation for PSSxxS51F6/C

*5 : PSS50NC1F6 is not included brake.

[Term] CSTBT™: Mitsubishi Electric's unique IGBT that makes use of
the carrier cumulative effect

RC-IGBT: Reverse conducting IGBT

HVIC: High Voltage IC, LVIC: Low Voltage IC,

BSD: Bootstrap Diode

UV: Supply Under Voltage protection,

OT: Over Temperature protection,

SC: Short Circuit protection

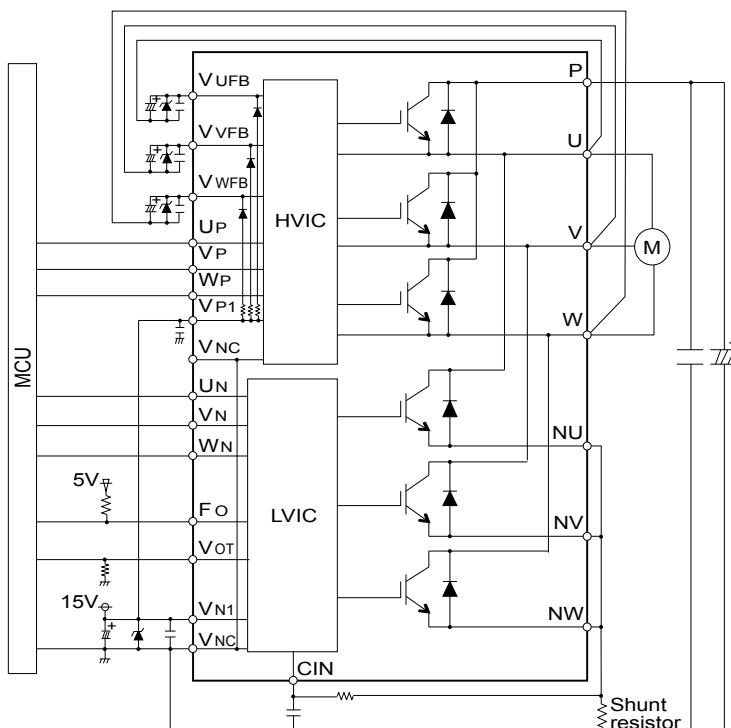
VOT: Analog temperature output

RoHS: Restriction of the use of certain Hazardous Substances
in electrical and electronic equipment

CIB: Converter Inverter Brake,

CI: Converter Inverter

■ Application circuit of super mini DIPIPM™



■ Series Matrix of 1200V DIPIPM™

V _{ces} (V)		1200V		
I _c (A)	Series	Mini	Large	
			Ver.6	Ver.4
				CIB/CI
5	PSS05S72FT	PSS05SA2FT	PS22A72	PSS05MC1FT PSS05NC1FT*1
10	PSS10S72FT	PSS10SA2FT	PS22A73	PSS10MC1FT PSS10NC1FT*1
15		PSS15SA2FT	PS22A74	PSS15MC1FT PSS15NC1FT*1
25		PSS25SA2FT	PS22A76	PSS25MC1FT PSS25NC1FT*1
35		PSS35SA2FT	PS22A78-E	PSS35MC1FT PSS35NC1FT*1
50		PSS50SA2FT	PS22A79	
75		PSS75SA2FT*		

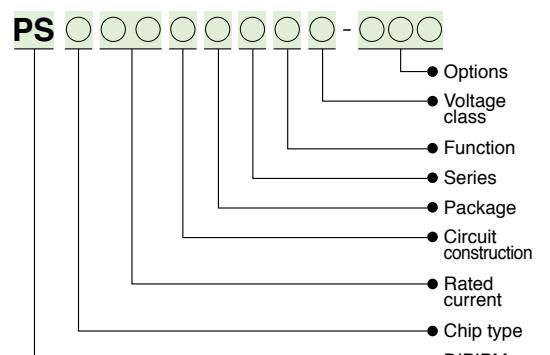
Chip	IGBT/MOSFET	CSTBT	CSTBT	CSTBT	CSTBT
UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake	
SC	N-side	N-side	N-side	N-side	
OT	—	—	—	—	
V _{OT}	N-side	N-side	N-side	N-side	
Active input	High(5V)	High(5V)	High(5V)	High(5V)	
Emitter pin of N-side	Open	Open	Open	Open	
Fault output	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	
Insulation voltage	2500Vrms	2500Vrms	2500Vrms	2500Vrms	
Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	
RoHS directive	Compliant	Compliant	Compliant	Compliant	
Pin type	—	—	—	—	

★: New Product Non-recommended : Please contact to the sales offices.

[Notes] *1: PSS**NC1FT is not included brake

[Term] BSD: Bootstrap Diode
 CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect.
 HVIC: High Voltage IC, LVIC: Low Voltage IC
 UV: Supply Under Voltage protection, OT: Over Temperature protection, SC: Short Circuit protection
 VOT: Analog temperature output
 RoHS: Restriction of hazardous substances in electrical and electronic equipment
 CIB: Converter Inverter Brake, CI: Converter Inverter

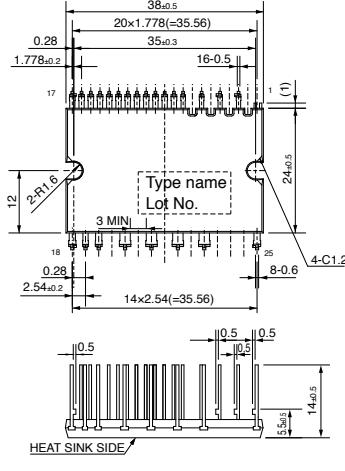
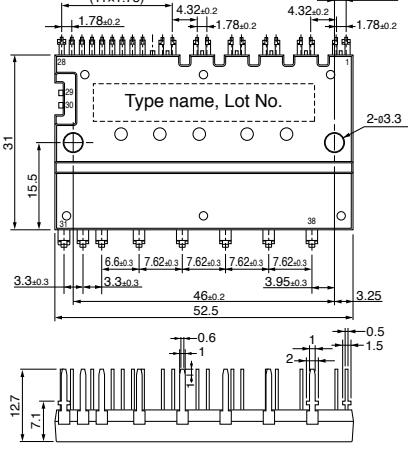
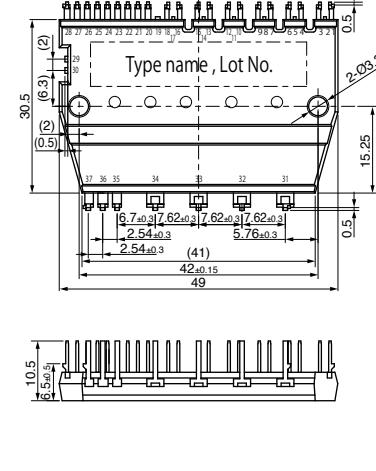
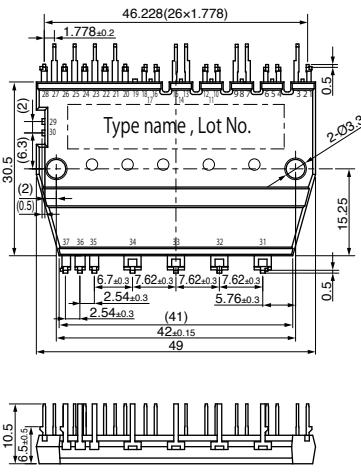
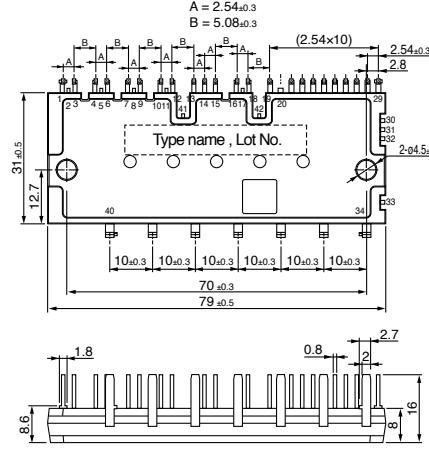
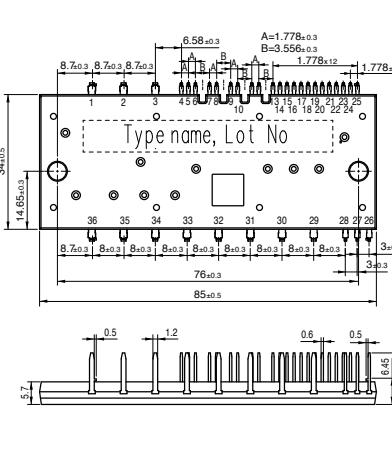
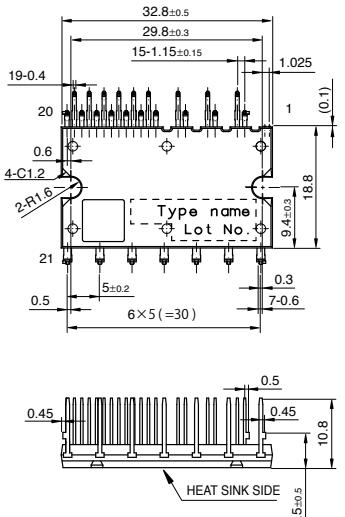
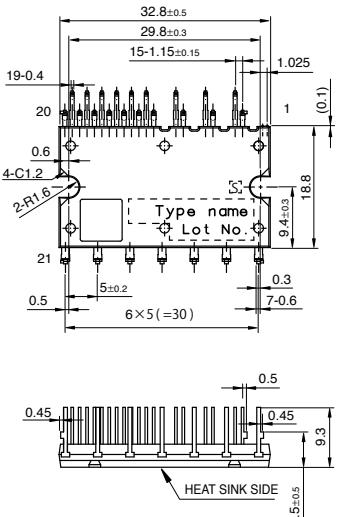
■ Type Name Definition of DIPIPM™



Line-up of DIPIPM™

Outline Drawing of DIPIPM™

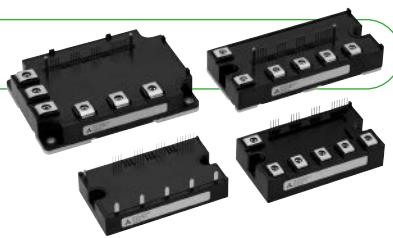
Unit:mm

<p>Super mini DIPIPM Ver.6 MOSFET Super mini DIPIPM Long (A)</p> 	<p>Mini DIPIPM (PSSxxS71F6) 1200V Mini DIPIPM</p> 	<p>Mini DIPIPM (PSSxxS51F6)</p> 
<p>Mini DIPIPM(PSSxxS51F6-C) Zigzag(C)</p> 	<p>Large DIPIPM</p> 	<p>DIPIPM+</p> 
<p>SLIMDIP-S/L Long</p> 	<p>SLIMDIP-S/L Short</p> 	



New Products

Loaded with built-in functions, contributing to inverters with enhanced energy savings



G1 Series IPM with 7th-generation IGBT

<Main Features>

- Power loss has been reduced with the introduction of the 7th-generation IGBT produced using CSTBT™¹ and a diode incorporating a RFC² structure that contributes to reducing the power consumed in inverters
- The new resin-insulated metal baseplate, originally introduced in 7th-generation IGBT modules, eliminates the solder-attached section, increasing the thermal cycle lifetime and improving inverter reliability
- In addition to the built-in functions of the previous product,³ automatic switching speed control, error detection function and Bootstrap diode (BSD)⁴ contribute to lowering inverter loss and shortening design time
- The introduction of PC-TIM⁵ contribute to simplifying the inverter assembly process (optional)

*1 CSTBT™: Mitsubishi Electric's unique IGBT that utilizes the carrier cumulative effect

*2 RFC: Relaxed field cathode

*3 Conventional product: IPM L1-Series

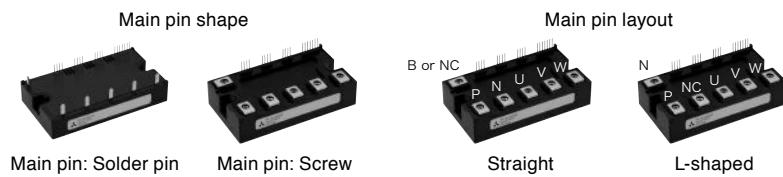
Built-in functions: Supply Undervoltage lock protection (UV), Short-circuit protection (SC), Over-temperature protection (OT)

*4 Bootstrap diode (BSD): Optional products include 50A, 75A, 100A/650V, 25A, 50A/1200V

*5 PC-TIM: Phase change-thermal interface material

■ "A" package main pin shape and layout

For the "A" package 6-in-1 (CG1A) main pin shape, select either solder pin or screw type
For the pin layout, select either straight or L-shaped



■ Lineup

V _{CEs} (V)	Package	Main pin shape	Main pin layout	I _c (A)									
				25	35	50	75	100	150	200	300	450	
650V	A package	Screw	Straight			PM50CG1A065*	PM75CG1A065*	PM100CG1A065*					
			L-shaped			PM50CG1AL065*	PM75CG1AL065*	PM100CG1AL065*					
		Solder pin	Straight			PM50CG1AP065*	PM75CG1AP065*	PM100CG1AP065*					
			L-shaped			PM50CG1APL065*	PM75CG1APL065*	PM100CG1APL065*					
	B package	Screw	L-shaped			PM50CG1B065*	PM75CG1B065*	PM100CG1B065*	PM150CG1B065*	PM200CG1B065*			
	C package	Screw	L-shaped							PM200CG1C065*	PM300CG1C065*	PM450CG1C065*	
1200V	A package	Screw	Straight	PM25CG1A120*	PM35CG1A120*	PM50CG1A120*							
			L-shaped	PM25CG1AL120*	PM35CG1AL120*	PM50CG1AL120*							
		Solder pin	Straight	PM25CG1AP120*	PM35CG1AP120*	PM50CG1AP120*							
			L-shaped	PM25CG1APL120*	PM35CG1APL120*	PM50CG1APL120*							
	B package	Screw	L-shaped	PM25CG1B120*	PM35CG1B120*	PM50CG1B120*	PM75CG1B120*	PM100CG1B120*					
	C package	Screw	L-shaped	PM25CG1B120*	PM35CG1B120*	PM50CG1B120*	PM75CG1B120*	PM100CG1B120*	PM150CG1B120*	PM200CG1B120*			

★: New Product

Representative reference is "A" package with screw terminal and straight layout (CG1A).

Line-up of IPM

Matrix of IPM Modules 650V/600V (No.: Number of outline drawing, see page 11 to 12)

V _{CES(V)} Series I _{C(A)}	650V			600V			Photovoltaic			L Series		
	G1 Series		L1 Series	S1 Series		V1 Series	Photovoltaic		L Series			
	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.
50	PM50CG1A065*	C 12							PM50B4LA060	B4 01		
	PM50RG1A065*	R 12	PM50CL1A060	C 01					PM50B5LA060	B5 01		
	PM50CG1B065*	C 10	PM50CL1B060	C 02					PM50B6LA060	B6 01	PM50CLA060	C
	PM50RG1B065*	R 10	PM50RL1A060	R 01	PM50CS1D060	C 05			PM50B4LB060	B4 02	PM50CLB060	C
	PM50CG1AL065*	C 12	PM50RL1B060	R 02					PM50B5LB060	B5 02	PM50RLA060	R
	PM50CG1AP065*	C 09	PM50RL1C060	R 03					PM50B6LB060	B6 02	PM50RLB060	R
	PM50CG1APL065*	C 09							PM50B4L1C060	B4 03		
	PM50RG1AP065*	R 09							PM50B5L1C060	B5 03		
	PM50RG1AP065*	R 09							PM50B6L1C060	B6 03		
75	PM75CG1A065*	C 12							PM75B4LA060	B4 01		
	PM75RG1A065*	R 12	PM75CL1A060	C 01					PM75B5LA060	B5 01		
	PM75CG1B065*	C 10	PM75CL1B060	C 02					PM75B6LA060	B6 01	PM75CLA060	C
	PM75RG1B065*	R 10	PM75RL1A060	R 01	PM75CS1D060	C 05			PM75B4LB060	B4 02	PM75CLB060	C
	PM75CG1AL065*	C 12	PM75RL1B060	R 02					PM75B5LB060	B5 02	PM75RLA060	R
	PM75CG1AP065*	C 09	PM75RL1C060	R 02					PM75B6LB060	B6 02	PM75RLB060	R
	PM75CG1APL065*	C 09							PM75B4L1C060	B4 03		
	PM75RG1AP065*	R 09							PM75B5L1C060	B5 03		
	PM75RG1AP065*	R 09							PM75B6L1C060	B6 03		
100	PM100CG1A065*	C 12										
	PM100CG1B065*	C 10	PM100CL1A060	C 01								
	PM100RG1B065*	R 10	PM100CL1B060	C 02								
	PM100CG1AL065*	C 12	PM100RL1A060	R 01	PM100CS1D060	C 05						
	PM100CG1AP065*	C 09	PM100RL1B060	R 02								
	PM100CG1APL065*	C 09										
150	PM150CG1B065*	C 10	PM150CL1A060	C 01								
	PM150RG1B065*	R 10	PM150CL1B060	C 02								
	PM150RL1A060	R 01	PM150CS1D060	C 05								
	PM150RL1B060	R 02										
200	PM200CG1B065*	C 10										
	PM200RG1B065*	R 10	PM200CL1A060	C 04								
	PM200CG1C065*	C 11	PM200RL1A060	R 04	PM200CS1D060	C 05						
	PM200RG1C065*	R 11										
300	PM300CG1C065*	C 11	PM300CL1A060	C 04								
	PM300RG1C065*	R 11	PM300RL1A060	R 04								
400/450	PM450CG1C065*	C 11						PM400DV1A060	D 06			
	PM450RG1C065*	C 11										
600								PM600DV1A060	D 06			
800								PM800DV1B060	D 07			
IGBT chip	CSTBT*1 Emitter sensor installed Temperature sensor installed		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*2 Built-in emitter sensor Built-in temperature sensor	
UV	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
OT	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
SC	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
Identification	P-side/N-side		—		—		—		—		—	
RoHS directive	Compliant		Compliant		Compliant		Compliant		Compliant		Compliant	
Compatibility	—		L Series		S-DASH SERVO		V Series		—		—	
Connection	D	B4	B5	B6	C	R						

★: New Product

Non-recommended: Please contact to the sales offices.

[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™

[Term] UV: Supply Under Voltage-lock protection, SC: Short-Circuit protection, OT: Over-temperature protection, OC: Over-current protection, CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect
RoHS: Restriction of hazardous substances in electrical and electronic equipment

■ Matrix of IPM Modules 1200V (No.: Number of outline drawing, see page 11 to 12)

V _{CES} (V)	Series	1200V												
		G1 Series			L1 Series			S1 Series			V1 Series			L Series
I _C (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.
25	PM25CG1A120*	C 12	PM25CL1A120	C 01	PM25CS1D120	C 05	PM25CLA120	C						
	PM25CG1B120*	C 10	PM25CL1B120	C 02			PM25CLB120	C						
	PM25RG1A120*	R 12	PM25RL1A120	R 01			PM25RLA120	R						
	PM25RG1B120*	R 10	PM25RL1B120	R 02			PM25RLB120	R						
	PM25CG1AL120*	C 12	PM25RL1C120	R 03										
	PM25CG1AP120*	C 09												
	PM25CG1APL120*	C 09												
	PM25RG1AP120*	R 09												
35	PM35CG1A120*	C 12												
	PM35CG1B120*	C 10												
	PM35RG1A120*	R 12												
	PM35RG1B120*	R 10												
	PM35CG1AL120*	C 12												
	PM35CG1AP120*	C 09												
	PM35CG1APL120*	C 09												
	PM35RG1AP120*	R 09												
50	PM50CG1A120*	C 12	PM50CL1A120	C 01	PM50CS1D120	C 05	PM50CLA120	C						
	PM50CG1B120*	C 10	PM50CL1B120	C 02			PM50CLB120	C						
	PM50RG1B120*	R 10	PM50RL1A120	R 01			PM50RLA120	R						
	PM50CG1AL120*	C 12	PM50RL1B120	R 02			PM50RLB120	R						
	PM50CG1AP120*	C 09												
	PM50CG1APL120*	C 09												
75	PM75CG1B120*	C 10	PM75CL1A120	C 01	PM75CS1D120	C 05	PM75CLA120	C						
	PM75RG1B120*	R 10	PM75CL1B120	C 02			PM75CLB120	C						
	PM75RG1A120*	R 01	PM75RL1A120	R 01			PM75RLA120	R						
	PM75RG1AP120*	R 02	PM75RL1B120	R 02			PM75RLB120	R						
100	PM100CG1B120*	C 10	PM100CL1A120	C 04	PM100CS1D120	C 05	PM100CLA120	C						
	PM100CG1C120*	C 11	PM100CL1B120	R 04			PM100RLA120	R						
	PM100RG1B120*	R 10	PM100RL1A120											
	PM100RG1C120*	R 11												
150	PM150CG1C120*	C 11	PM150CL1A120	C 04										
	PM150RG1C120*	R 11	PM150RL1A120	R 04										
200	PM200CG1C120*	C 11					PM200DV1A120	D 06	PM200CLA120	C	08			
	PM200RG1C120*	R 11												
300							PM300DV1A120	D 06	PM300CLA120	C	08			
450							PM450DV1A120	D 06	PM450CLA120	C	08			
IGBT chip	CSTBT*1 Emitter sensor installed Temperature sensor installed		CSTBT*1 Built-in current sensor Built-in temperature sensor		CSTBT*1 Built-in current sensor Built-in temperature sensor		CSTBT*1 Built-in current sensor Built-in temperature sensor		CSTBT*2 Built-in current sensor Built-in temperature sensor					
Fault output	UV	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side				
	OT	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side				
	SC	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side				
Identification	P-side/N-side		—		—		—		—					
RoHS directive	Compliant		Compliant		Compliant		Compliant		Compliant					
Compatibility	—		L Series		S-DASH SERVO		V Series		—					
Connection	D			C			R							

★: New Product Non-recommended : Please contact to the sales offices.

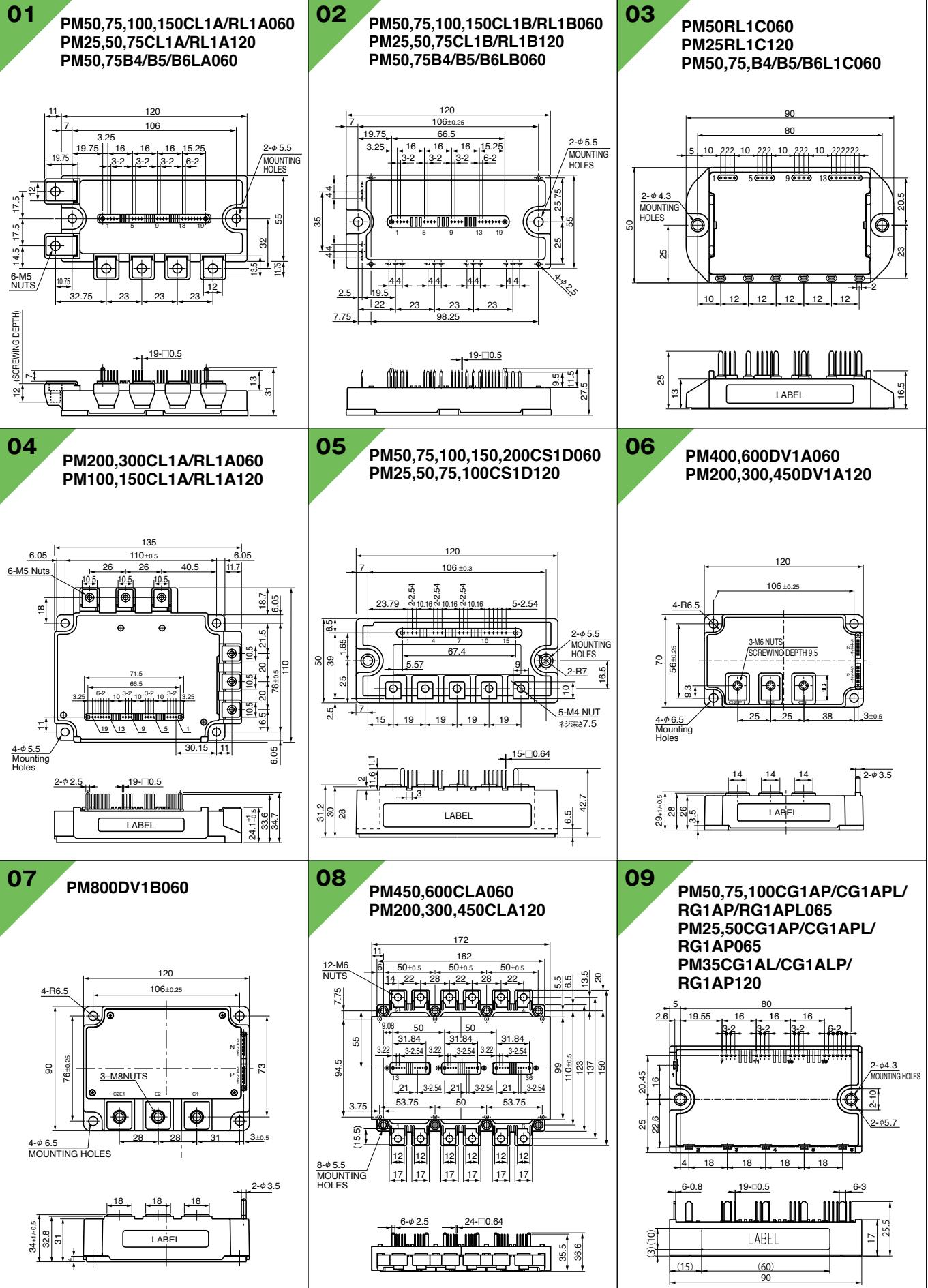
[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™

[Term] UV : Supply Under Voltage-lock protection, SC : Short-Circuit Protection, OT : Over-temperature protection, OC : Over-current protection. RoHS : the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

Line-up of IPM

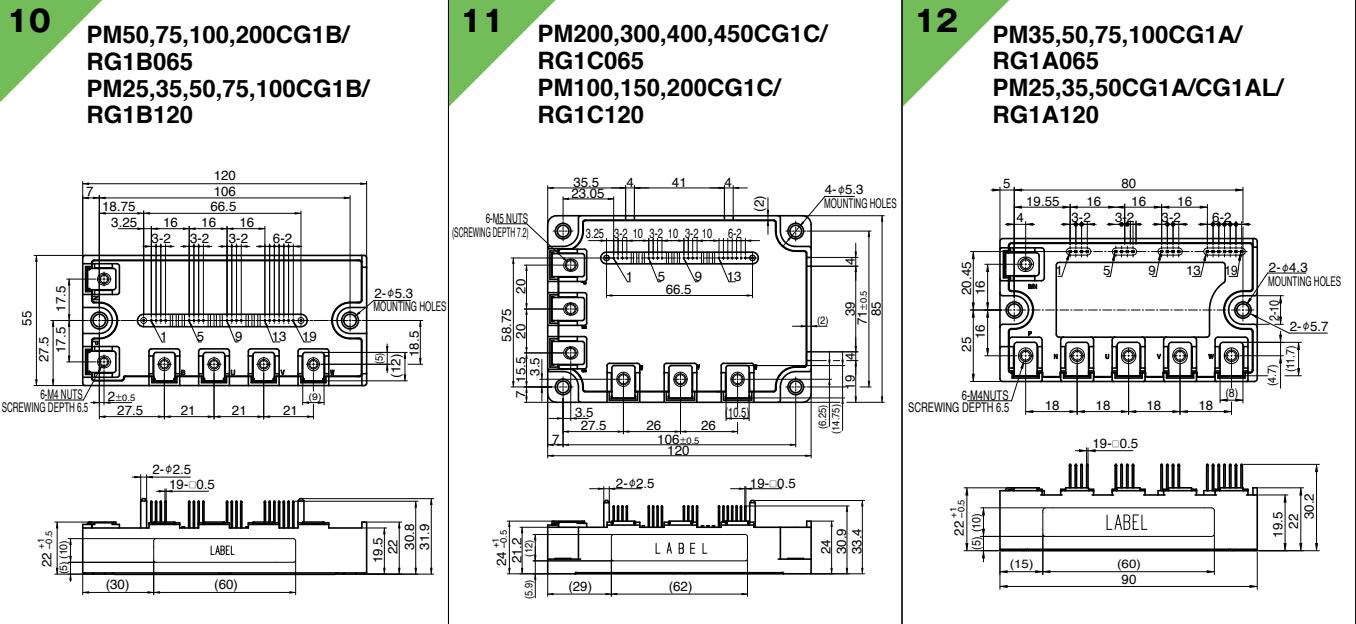
Outline Drawing of IPM

Unit:mm



■ Outline Drawing of IPM

Unit:mm



Line-up of MOSFET Modules

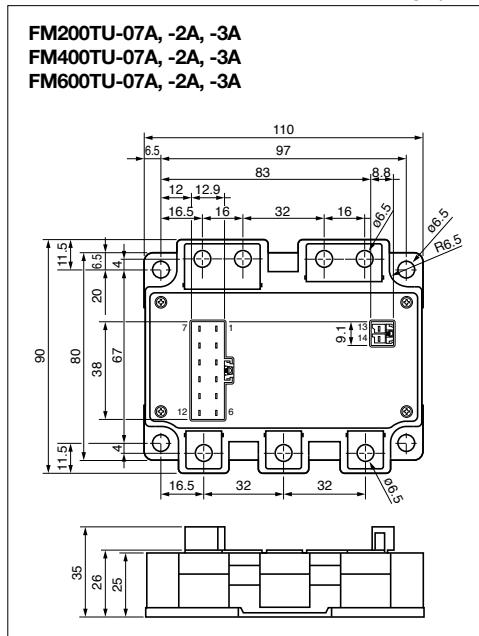
■ Series Matrix of MOSFET Modules

RoHS directive compliant

V_{DSS} I_D (A)	75V	Connection	100V	Connection	150V	Connection
100	FM200TU-07A	T	FM200TU-2A	T	FM200TU-3A	T
200	FM400TU-07A	T	FM400TU-2A	T	FM400TU-3A	T
300	FM600TU-07A	T	FM600TU-2A	T	FM600TU-3A	T
Connection						

■ Outline Drawing of MOSFET Modules

Unit:mm





New Products

New lineup contributes to simplifying design, downsizing, energy-saving of industrial inverters.



IGBT Module T/T1-Series

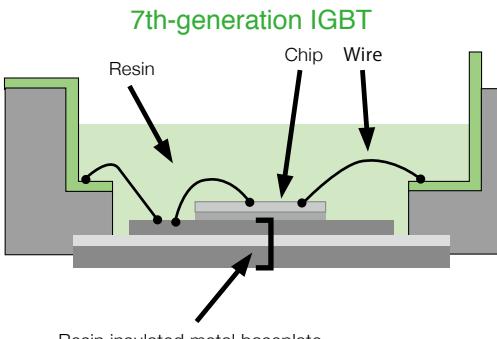
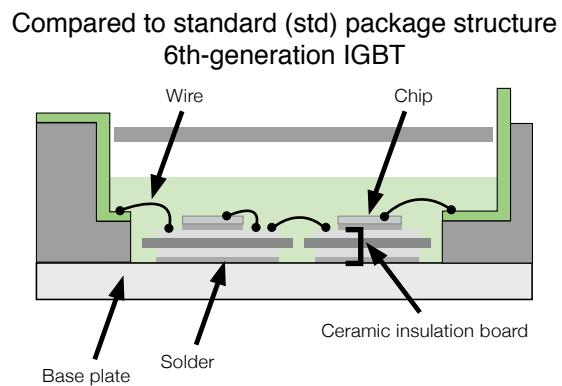
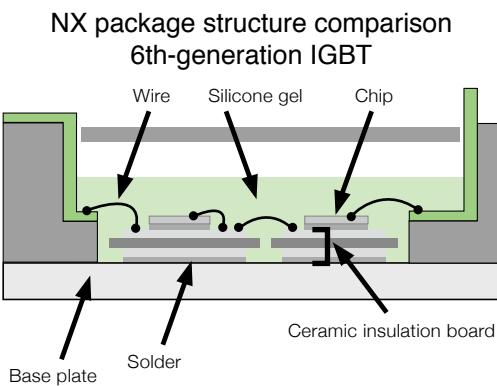
<Main Features>

- New modules equipped with three-phase converter, inverter, and brake circuit(CIB), contributes to simplifying design for inverter systems
- CIB modules contribute to compact inverter systems by reducing package size by 36% compared to the Mitsubishi Electric's existing module.(CIB)
- Power loss has been reduced with the introduction of the 7th-generation IGBT produced using CSTBT™² and a diode incorporating a relaxed field of cathode (RFC) structure
- The new structure introduced eliminates the solder-attached section, increasing the thermal cycle lifetime, which contributes to improving the reliability of inverters
- The introduction of press-fit pins and PC-TIM¹ contribute to simplifying the assembly process for inverters

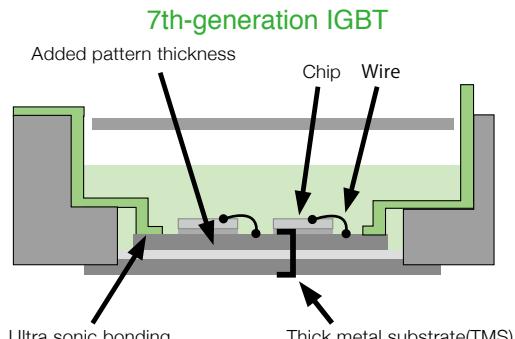
*1 PC-TIM: Phase change - thermal interface material

*2 CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect

■ New structure realizes improved reliability (improved thermal cycle lifetime)



※Adopts SoLid Cover(SLC) Technology



※Standard package is not available for CIB

◆ Press-fit terminal support (NX)

- Possible to select the control pin shape (soldered terminals/press-fit terminals)
- Solder attachment process eliminated

■ Press-fit pin





Feature Products

Contributes to realizing smaller, energy-saving large-capacity inverters

Power Modules for 3-level Inverters

<Main Features>

- Compatible with 3-level inverters, reducing power consumption approx. 30%^{*1}
- New package developed^{*2} contributing to lower inductance and simplified inverter circuit structure
- IGBT specifications optimized^{*3} with development of new compact, low-inductance package
- 4-in-1^{*4} and 1-in-1/2-in-1^{*5} lineup contributes to improved compactness and freedom in inverter design

*1 Comparison between 3-level inverter incorporated in this device and 2-level inverter in conventional device.

*2 1-in-1/2-in-1 type external dimensions of 130x67mm, 4-in-1 type external dimensions of 115x82mm, new package developed with innovative terminal positioning.

*3 IGBT specifications optimized for 3-level inverters, adopting CSTBT™ (Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect).

*4 4-in-1 module with one 3-level inverter arm in one package.

*5 Bidirectional switch model as emitter common connection.

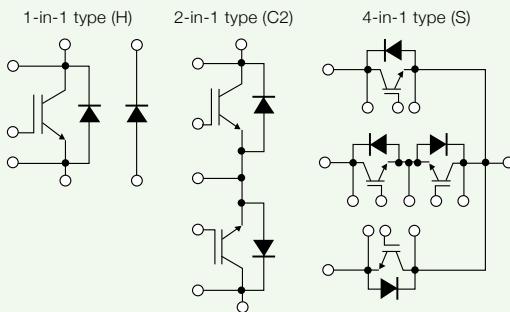


1-in-1 / 2-in-1 type



4-in-1 type

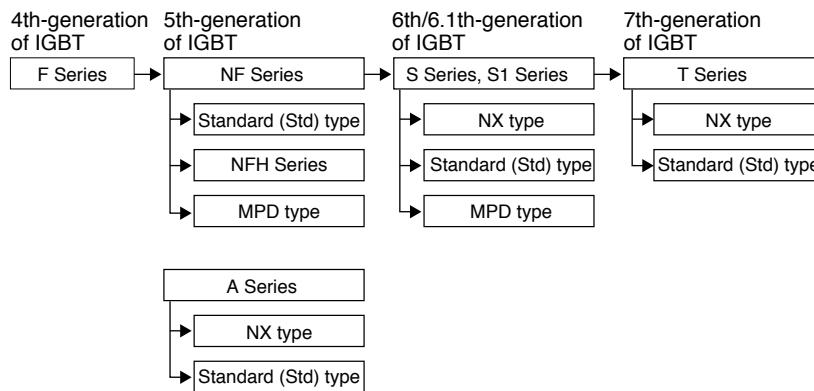
Internal circuit diagram



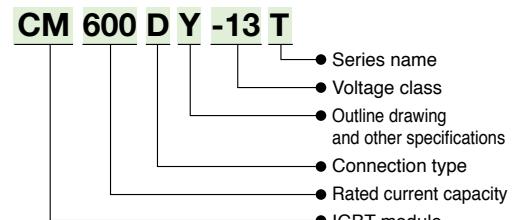
Lineup

Main application	Model	Module type	Rated voltage	Rated current	Circuit structure	External dimensions WxD(mm)
125-500kW inverter	CM400ST-24S1	IGBT	1200V	400A	4-in-1	115x82
500kW - inverter	CM1400HA-24S	IGBT	1200V	1400A	1-in-1	130x67
	RM1400HA-24S	Diode	1200V	1400A	1-in-1	130x67
	CM1000HA-34S	IGBT	1700V	1000A	1-in-1	130x67
	CM500C2Y-24S	IGBT	1200V	500A	2-in-1	130x67

Evolution of IGBT Module Series



Type Name Definition of IGBT Modules



Features of IGBT Module Series

S Series

- Lineup includes various package types
- 6th-generation CSTBT™ delivers low-loss performance
- Thinner package (Height: 17mm) (NX type)
- Suited to large-capacity applications (MPD type)

MPD: Mega power dual

NFH Series

- High-speed CSTBT™ delivers low-loss performance
- Soft switching (resonant) turn-off function (ZVS)
- Enhanced inner wiring (skin effect)

CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect.

Line-up of IGBT Modules

Matrix of IGBT Modules 650V/600V (No.: Number of outline drawing, see page 19 to 20)

RoHS directive (2011/65/EU) compliant

V _{CES} (V)	650V						600V													
	Series I _C (A)	T/T1-Series NX Type		Connection	No.	T-Series std Type	Connection	No.	A-Series NX Type		Connection	No.	NF-Series		Connection	No.	NF-Series NFH Type		Connection	No.
50	CM50MXUB-13T★★ CM50MXUB-13T1★★ CM50MXUBP-13T★★ CM50MXUBP-13T1★★	M M M M	42 42 - -																	
75	CM75MXUB-13T★★ CM75MXUB-13T1★★ CM75MXUBP-13T★★ CM75MXUBP-13T1★★	M M M M	42 42 - -						CM75MX-12A	M R	01 02	CM75TL-12NF CM75RL-12NF		T R	07 07					
100	CM100TX-13T★ CM100TXP-13T★ CM100MXUB-13T★★ CM100MXUB-13T1★★ CM100MXUBP-13T★★ CM100MXUBP-13T1★★ CM100MXUD-13T★★ CM100MXUD-13T1★★ CM100MXUDP-13T★★ CM100MXUDP-13T1★★	T T M M M M M M M M	33 37 42 42 - - 44 44 - -	CM100DY-13T★	D	30	CM100MX-12A CM100RX-12A	M R	01 02	CM100TL-12NF CM100RL-12NF		T R	07 07	CM100DUS-12F	D	13				
150	CM150TX-13T★ CM150TXP-13T★ CM150RX-13T★ CM150RXP-13T★ CM150MXUD-13T★★ CM150MXUD-13T1★★ CM150MXUDP-13T★★ CM150MXUDP-13T1★★	T T R R M M M M	33 37 34 38 44 44 - -	CM150DY-13T★	D	30	CM150RX-12A	R	02	CM150DY-12NF CM150TL-12NF CM150RL-12NF		D T R	08 07 07	CM150DUS-12F	D	13				
200	CM200TX-13T★ CM200TXP-13T★ CM200RX-13T★ CM200RXP-13T★	T T R R	33 37 34 38	CM200DY-13T★	D	30	CM200RX-12A	R	02	CM200DY-12F CM200TL-12NF CM200RL-12NF		D T R	08 09 09	CM200DU-12NFH	D	13				
225																				
300	CM300DX-13T★ CM300DXP-13T★	D D	28 39	CM300DY-13T★	D	31	CM300DX-12A	D	03	CM300DY-12NF		D	08	CM300DU-12NFH	D	14				
400							CM400DY-13T★	D	31	CM400DX-12A	D	03	CM400DY-12NF		D	10	CM400DU-12NFH	D	14	
450	CM450DX-13T★ CM450DXP-13T★	D D	28 39																	
600	CM600DX-13T★ CM600DXP-13T★	D D	28 39	CM600DY-13T★	D	32							CM600DY-12NF		D	11	CM600DU-12NFH	D	15	
1000																				
Connection	D		T		R		M													

★★: Under Development ★: New Product

Non-recommended : Please contact to the sales offices.

Matrix of Power Modules for 3-level Inverter (No.: Number of outline drawing, see page 22 to 23)

RoHS directive (2011/65/EU) compliant

V _{CES} /V _{RRM}	1200 V IGBT Module			1700 V IGBT Module			1200 V Diode Module			1700 V Diode Module				
	I _C /I _F	T/S/S1-Series std Type		Connection	No.	S/S1-Series std Type	Connection	No.	S/S1-Series std Type	Connection	No.	S/S1-Series std Type	Connection	No.
400	CM400ST-24S1★ CM400C1Y-24S	S C1	35 11											
450	CM450C1Y-24T★★	C1	32											
500	CM500C2Y-24S★	C	36											
600	CM600C1Y-24T★	C1	32	CM600HA-34S★	H	36						RM600DY-34S★	D	32
800				CM800HA-34S★	H	36						RM800DY-34S★	D	32
1000				CM1000HA-34S★	H	36								
1400	CM1400HA-24S★	H	36						RM1400HA-24S★	H	36			
Connection	IGBT module	C1		C2		H		S		Diode module	H		D	

*Connection of diode module and IGBT module are different.

★★: Under Development ★: New Product

Line-up of IGBT Modules

Matrix of IGBT Modules 1200V (No.: Number of Outline Drawing, see page 19 to 23)

RoHS directive (2011/65/EU) compliant

V _{CES} (V)		1200V															
Series Ic	T/T1-Series NX Type	T-Series std Type			S/S1-Series NX Type			S/S1-Series std Type			S/S1-Series MPD Type			A-Series ^{※1} NF-Series ^{※1}			
		Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.		
35	CM35MXUA-24T** CM35MXUA-24T1** CM35MXUAP-24T** CM35MXUAP-24T1**	M M M M	41 41 - -			CM35MXA-24S	M M	04 04									
50	CM50MXUA-24T** CM50MXUA-24T1** CM50MXUAP-24T** CM50MXUAP-24T1**	M M M M	41 41 - -			CM50MXA-24S	M M	04 04						CM50RL-24NF CM50TL-24NF	R T 07 07		
75	CM75MXUB-24T** CM75MXUB-24T1** CM75MXUBP-24T** CM75MXUBP-24T1** CM75MXUC-24T** CM75MXUC-24T1** CM75MXUCP-24T** CM75MXUCP-24T1**	M M M M M M M M	42 42 - - 43 43 - -			CM75MXA-24S CM75TX-24S CM75RX-24S	M T R	04 05 02						CM75RL-24NF CM75TL24NF	R T 07 07		
100	CM100TX-24T* CM100TXP-24T* CM100RX-24T* CM100RXP-24T* CM100MXUC-24T** CM100MXUC-24T1** CM100MXUCP-24T** CM100MXUCP-24T1**	T T R R M M M M	33 37 34 38 43 43 - -	CM100DY-24T*	D D	30	CM100MXA-24S CM100TX-24S1 CM100RX-24S1	M T R	04 25 26						CM100DY-24A CM100DY-24NF CM100E3Y-24NF CM100RL-24NF CM100TL-24NF CM100DU-24NFH	D D E3 R T D 08 08 08 07 07 13	
150	CM150TX-24T* CM150TXP-24T* CM150RX-24T* CM150RXP-24T* CM150MXUD-24T** CM150MXUD-24T1** CM150MXUDP-24T** CM150MXUDP-24T1**	T T R R M M M M	33 37 34 38 44 44 - -	CM150DY-24T*	D D	30	CM150DX-24S CM150EXS-24S CM150TX-24S1 CM150RX-24S1	D E T R	03 24 25 26						CM150DY-24A CM150DY-24NF CM150E3Y-24NF CM150RL-24NF CM150TL-24NF CM150DU-24NFH	D D E3 R T D 08 08 08 09 09 13	
200	CM200TX-24T* CM200TXP-24T*	T T	33 37	CM200DY-24T*	D	31	CM200EXS-24S CM200RXL-24S	E R	24 21						CM200DY-24A CM200DY-24NF CM200RL-24NF CM200TL-24NF CM200DU-24NFH	D D R T D 08 10 09 09 14	
225	CM225DX-24T* CM225DXP-24T*	D D	28 39				CM225DX-24S1	D	27								
300	CM300DX-24T* CM300DXP-24T*	D D	28 39	CM300DY-24T*	D	31	CM300DX-24S1 CM300EXS-24S CM300RXL-24S1*	D E R	27 24 21	CM300DY-24S	D	10				CM300DY-24A CM300DY-24NF CM300DU-24NFH	D D D 10 11 14
400																CM400DY-24A CM400HA-24A CM400DY-24NF CM400DU-24NFH	D H D D 11 16 11 15
450	CM450DX-24T* CM450DXP-24T*	D D	28 39	CM450DY-24T*	D	32	CM450DX-24S1	D	27	CM450DY-24S	D	11					
600	CM600DX-24T* CM600DXP-24T*	D D	28 39	CM600DY-24T*	D	32	CM600DX-24S1 CM600DXL-24S	D D	27 6	CM600DY-24S	D	11				CM600DY-24A CM600HA-24A CM600DU-24NF CM600DU-24NFH	D H D D 11 16 12 15
800										CM800DY-24S	D	12					
900														CM900DUC-24S	D 17		
1000	CM1000DX-24T* CM1000DXP-24T*	D D	29 40				CM1000DXL-24S	D	06								
1400										CM1400HA-24S*	H	36	CM1400DUC-24S	D	17		
Connection		H		D		T		R		M		E		E3			

*1: A-Series have model names ending with A, NF-Series have model name ending with NF/NFH

★: Under Development ★: New Product

Matrix of IGBT Modules 1700V

RoHS directive (2011/65/EU) compliant

V _{CES} (V)	1700V														A-Series				
	Series I _c	T-Series			T-Series			S/S1-Series			S/S1-Series			S/S1-Series					
		NX Type	Connection	No.	std Type	Connection	No.	NX Type	Connection	No.	std Type	Connection	No.	MPD Type	Connection	No.	std Type	Connection	No.
35																			
50																			
75					CM75DY-34T**	D 30	CM75Mxa-34SA CM75Rx-34SA	M 23 R 19							CM75DY-34A	D 08			
100	CM100TX-34T** CM100TXP-34T**	T 33 T 37	CM100DY-34T**	D 30											CM100DY-34A	D 08			
150	CM150TX-34T** CM150TXP-34T**	T 33 T 37	CM150DY-34T**	D 31	CM150DX-34SA CM150RXL-34SA	D 20 R 21									CM150DY-34A	D 10			
200			CM200DY-34T**	D 31	CM200DX-34SA CM200EXS-34SA	D 20 E 24									CM200DY-34A	D 10			
225	CM225DX-34T** CM225DXP-34T**	D 28 D 39																	
300	CM300DX-34T** CM300DXP-34T**	D 28 D 39	CM300DY-34T**	D 32	CM300DX-34SA	D 20									CM300DY-34A	D 11			
400			CM400DY-34T**	D 32											CM400DY-34A	D 18			
450	CM450DX-34T** CM450DXP-34T**	D 28 D 39			CM450DXL-34SA	D 22													
500															CM500HA-34A	H 16			
600	CM600DX-34T** CM600DXP-34T**	D 28 D 39			CM600DXL-34SA	D 22	CM600HA-34S*	H 36											
800								CM800HA-34S*	H 36										
900																			
1000								CM1000HA-34S*	H 36	CM1000DUC-34SA	D 17								
1400																			
Connection	H		D		T		R		M		E								

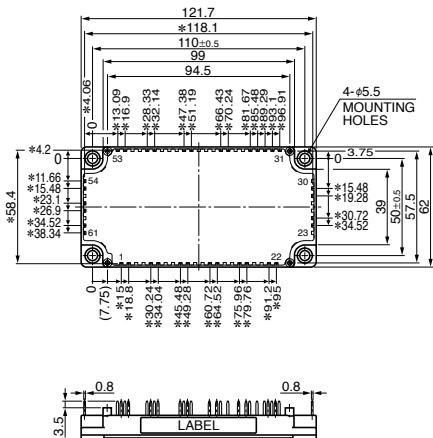
★★: Under Development ★: New Product

Line-up of IGBT Modules

Outline Drawing of IGBT Modules

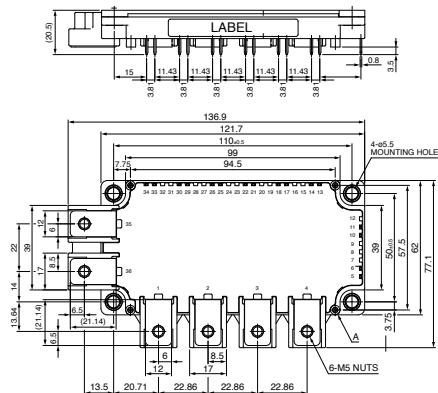
Unit:mm

01 CM75,100MX-12A



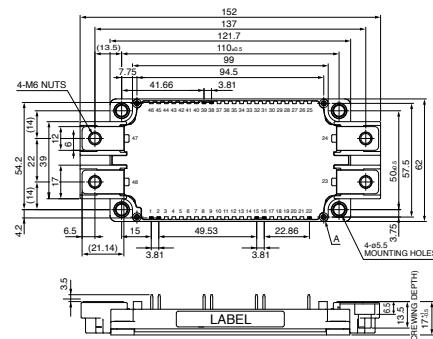
*All dimensions with a tolerance of ± 0.5

02 CM100,150,200RX-12A
CM75RX-24S



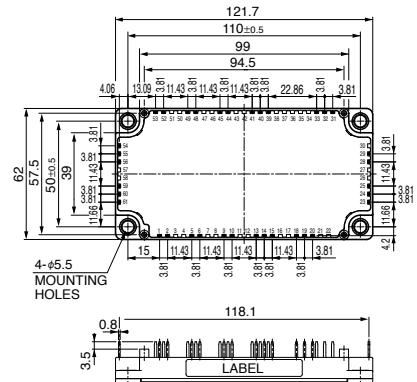
*All dimensions with a tolerance of ± 0.5

03 CM300,400DX-12A
CM150,200DX-24S

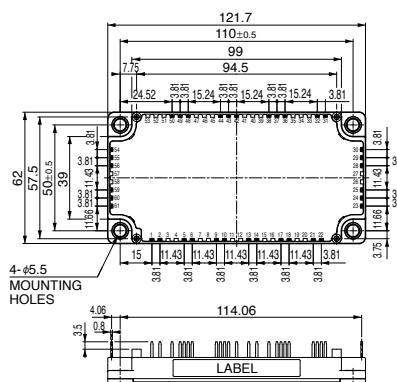


*All dimensions with a tolerance of ± 0.5

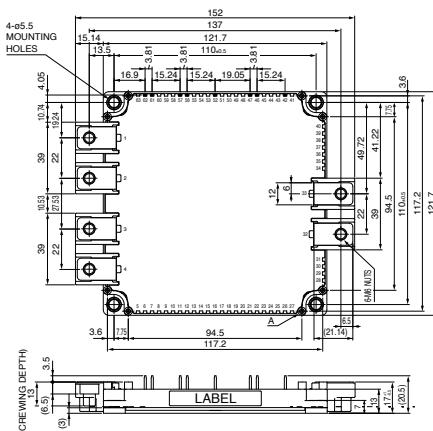
04 CM35,50,75,100Mxa-24S



05 CM75TX-24S

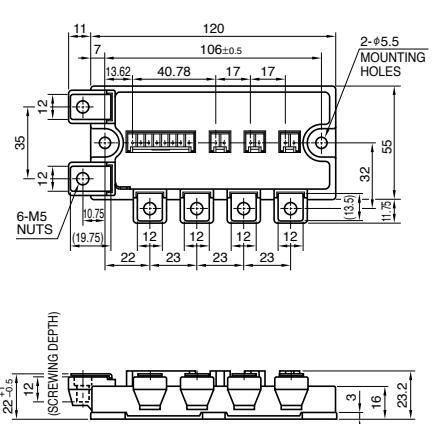


06 CM600,1000DXL-24S

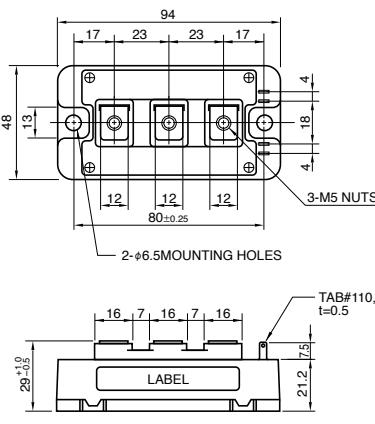


*All dimensions with a tolerance of ± 0.5

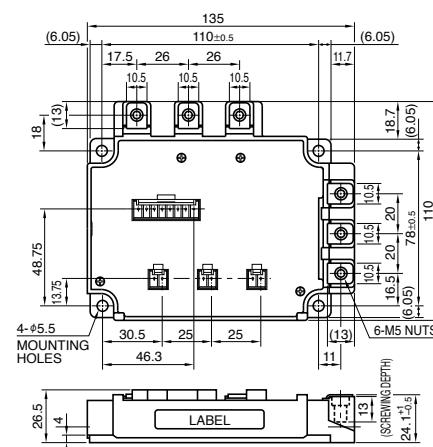
07 CM75,100,150TL/RL-12NF
CM50,75,100TL/RL-24NF



08 CM150,200,300DY-12NF
CM100,150DY-24NF
CM100,150,200DY-24A
CM75,100DY-34A
CM100,150E3Y-24NF



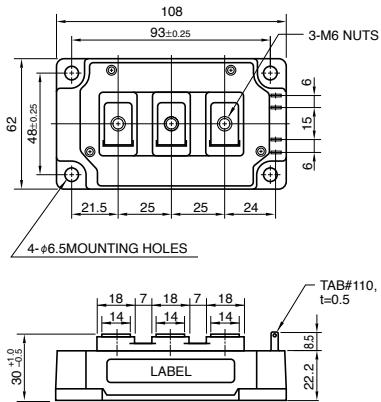
09 CM200TL/RL-12NF
CM150,200TL/RL-24NF



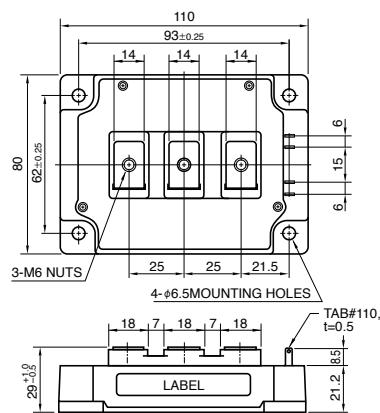
■ Outline Drawing of IGBT Modules

Unit:mm

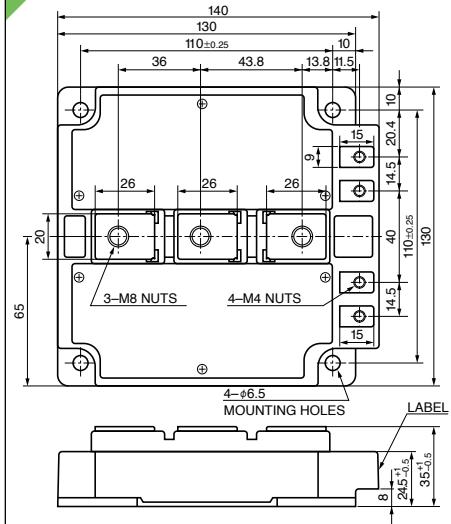
10 CM400DY-12NF
CM200DY-24NF
CM300DY-24A
CM300DY-24S
CM150,200DY-34A



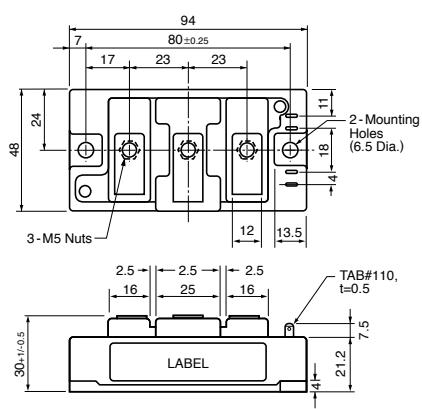
11 CM600DY-12NF
CM400DY-24NF
CM400,600DY-24A
CM300DY-34A
CM400C1Y-24S
CM450DY-24S
CM600DY-24S
CM300DY-24NF



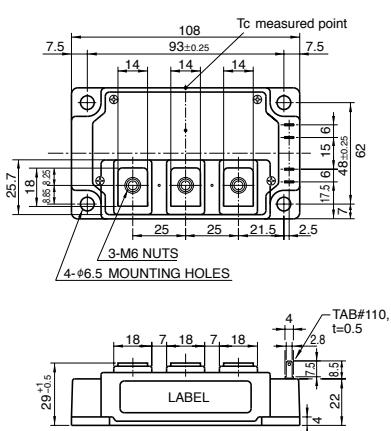
12 CM600DU-24NF
CM800DY-24S



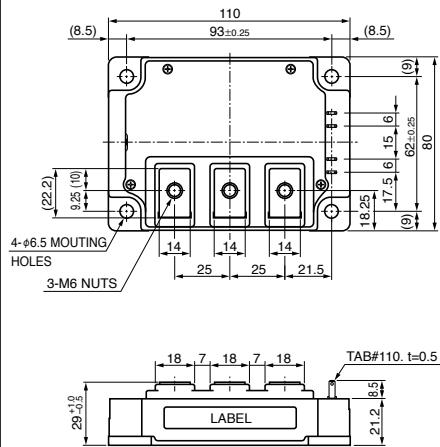
13 CM100,150DUS-12F
CM200DU-12NFH
CM100,150DU-24NFH



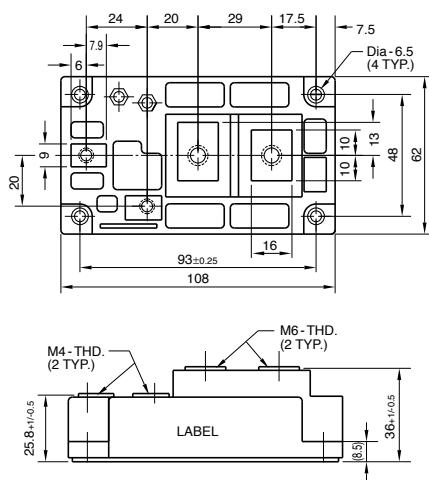
14 CM300,400DU-12NFH
CM200,300DU-24NFH



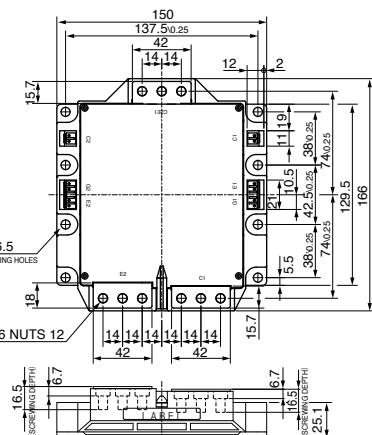
15 CM600DU-12NFH
CM400,600DU-24NFH



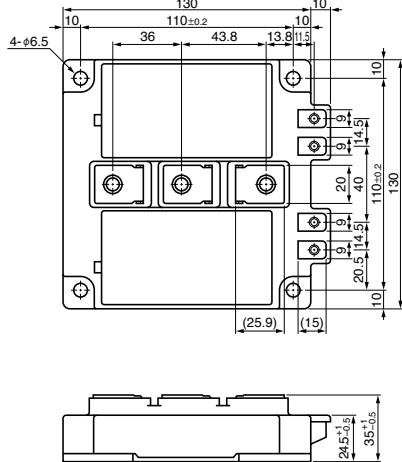
16 CM400,600HA-24A
CM500HA-34A



17 CM900,1400DUC-24S
CM1000DUC-34SA



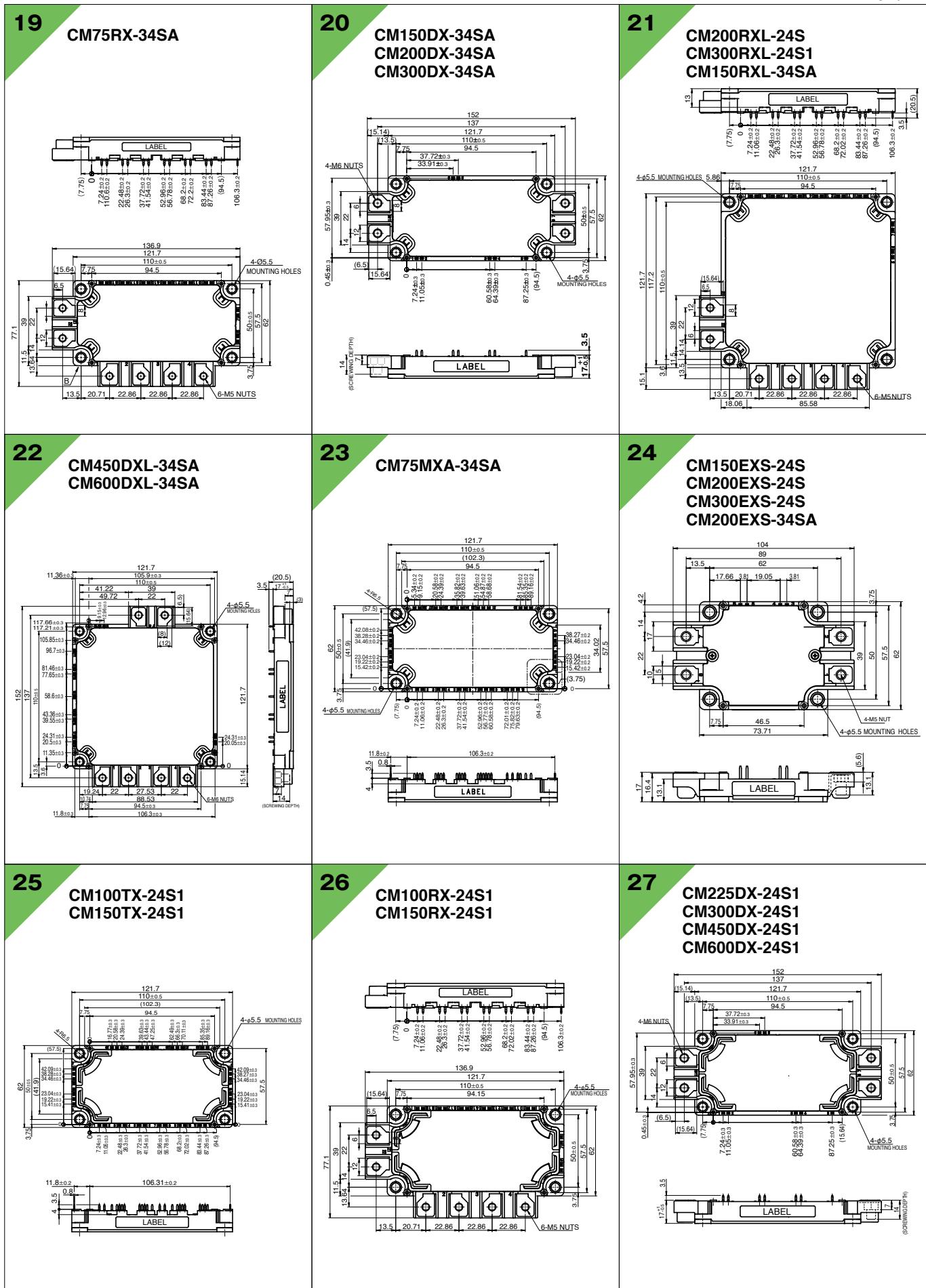
18 CM400DY-34A



Line-up of IGBT Modules

■ Outline Drawing of IGBT Modules

Unit:mm

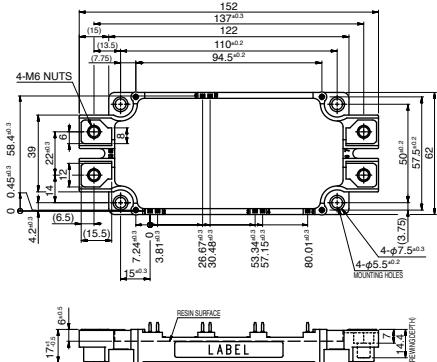


■ Outline Drawing of IGBT Modules

Unit:mm

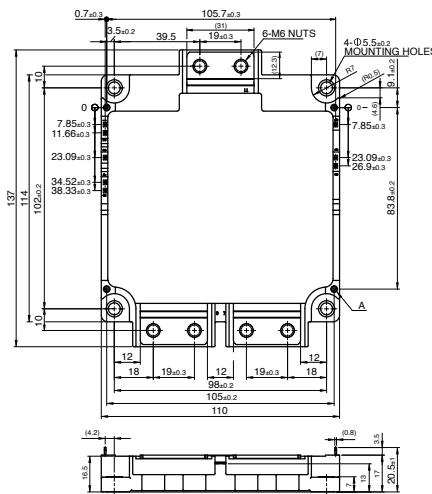
28

CM300,450,600DX-13T
CM225,300,450,600DX-24T



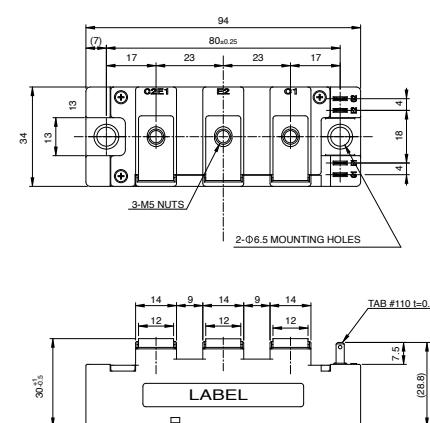
29

CM1000DX-24T



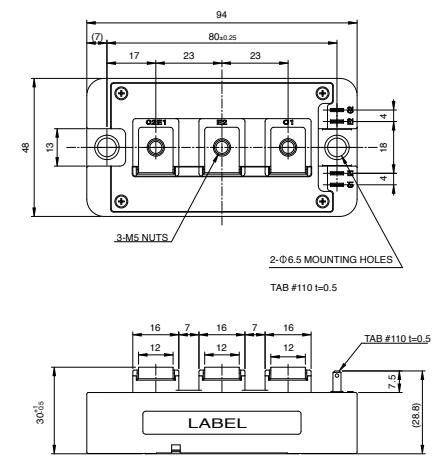
30

CM100,150,200DY-13T
CM100,150DY-24T



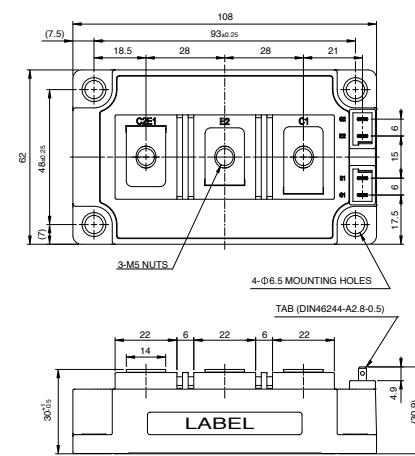
31

CM300,400DY-13T
CM200,300DY-24T



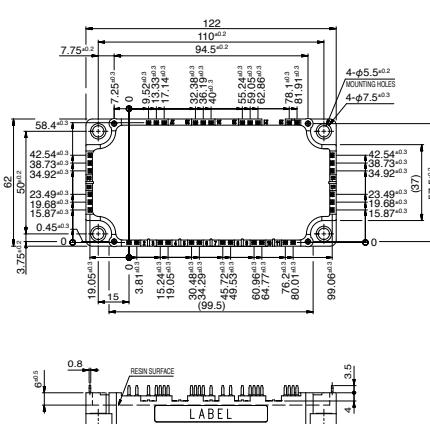
32

CM600DY-13T
CM450,600DY-24T
CM450,600C1Y-24T



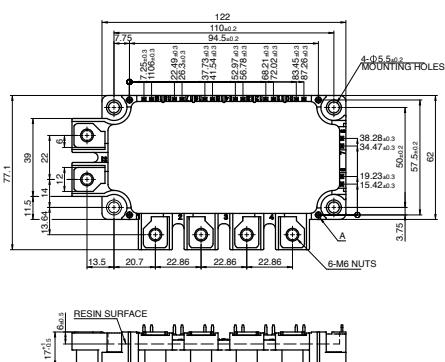
33

CM100,150,200TX-13T
CM100,150,200TX-24T
CM100,150TX-34T



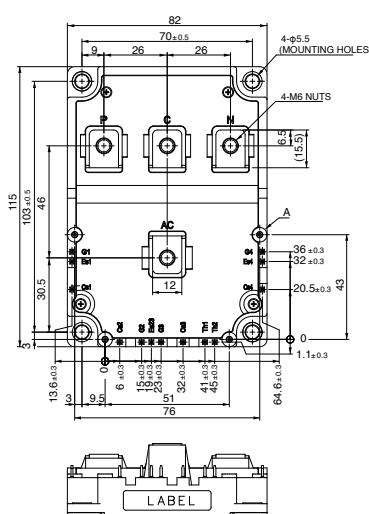
34

CM150,200RX-13T
CM100,150RX-24T



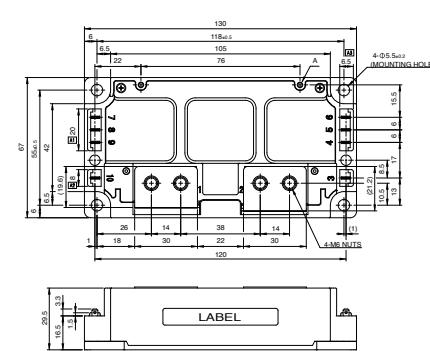
35

CM400ST-24S1



36

CM500C2Y-24S
CM1400HA-24S
CM1000HA-34S
RM1400HA-24S



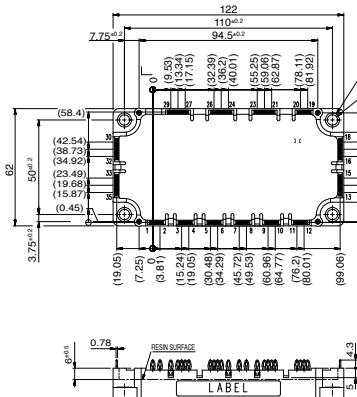
Line-up of IGBT Modules

Outline Drawing of IGBT Modules

Unit:mm

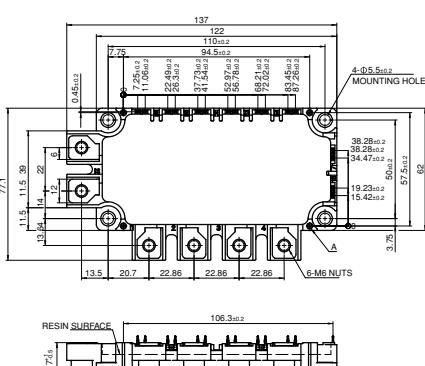
37

CM100,150,200TXP-13T
CM100,150,200TXP-24T
CM100,150TXP-34T



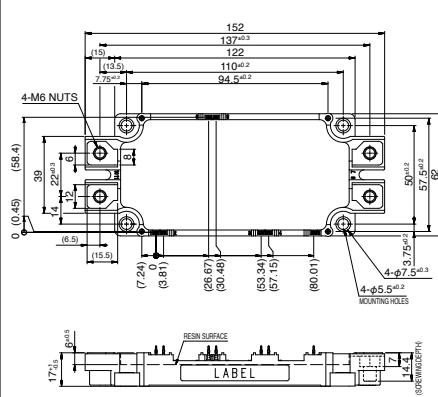
38

CM150,200RXP-13T
CM100,150RXP-24T



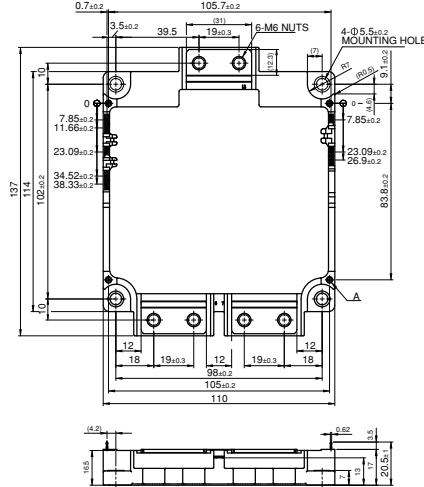
39

CM300,450,600DXP-13T
CM225,300,450,600DXP-24T



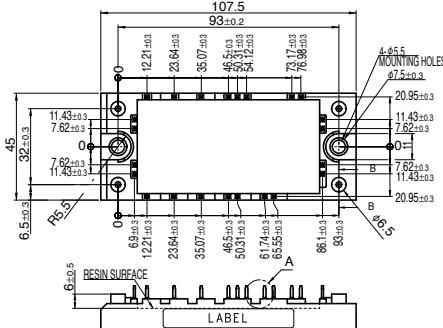
40

CM1000DXP-24T



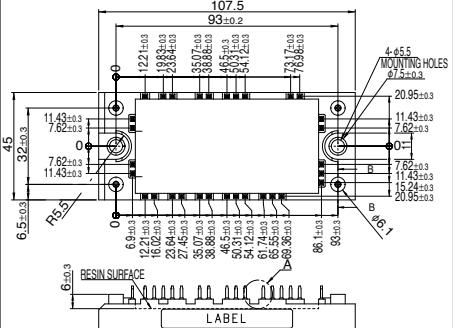
41

CM35,50MXUA-24T/24T1



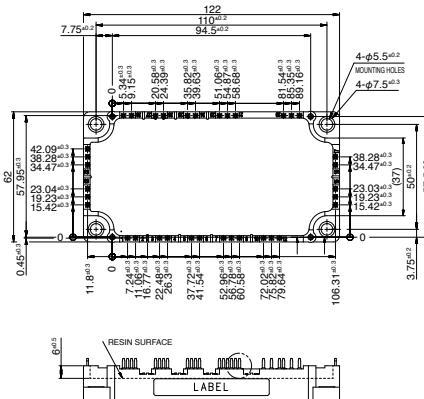
42

CM50,75,100MXUB-13T/13T1
CM75MXUB-24T/24T1



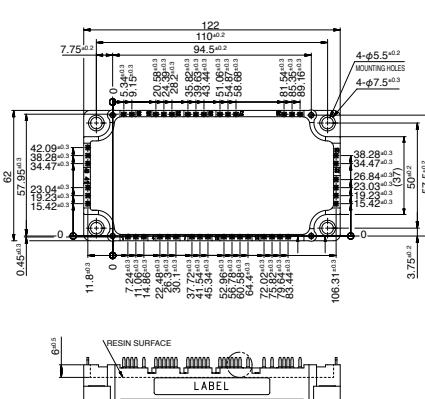
43

CM75,100MXUC-24T/24T1



44

CM100/150MXUD-13T/T1
CM150MXUD-24T/24T1





New Products

X Series HVIGBT Modules

Existing compatible package: Standard type
Contributes to smaller, higher-capacity inverter systems by expanding lineup

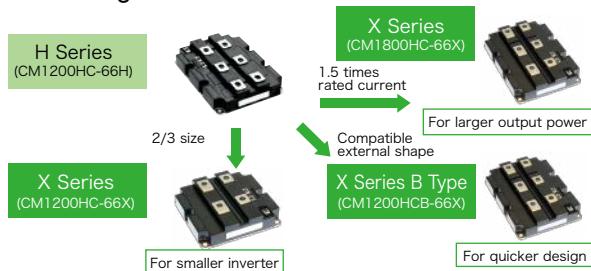
	std. Type	
1.7kV	2400A/3600A	1600A/2400A
3.3kV	1200A/1800A	1200A
4.5kV	900A/1350A/1500A	900A/1000A
6.5kV	600A/900A/1000A	600A

<Main Features>

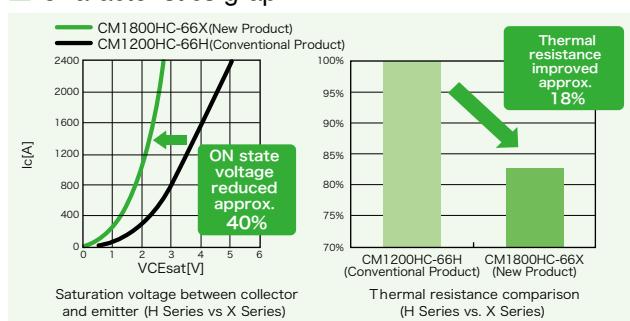
- Power loss reduced by incorporating 7th-generation IGBT and RFC¹ diode
- Industry-leading power² for increased inverter capacity
- External size reduced 33% while maintaining the same voltage resistance and rated current as conventional products,³ contributing to inverter downsizing
- Optimal package internal structure realizes improved heat dissipation, humidity resistance and flame retardance, increasing product life

¹ RFC : Relaxed field of cathode
² 3.3kV - 6.5kV (as of Apr. 5, 2018 based on Mitsubishi Electric research)
³ Comparison of X Series 1200HC-66X and H Series CM1200HC-66H

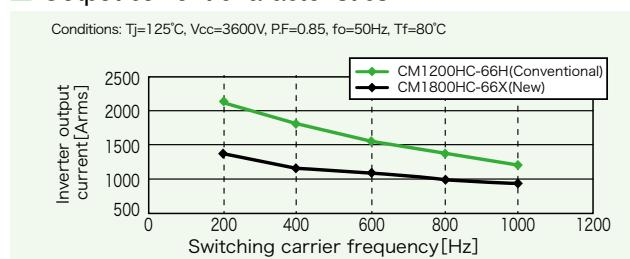
Positioning from conventional series



Characteristics graph



Output current characteristics



New common frame package: LV100/HV100 type
Class-leading current density contributes to increased power output in inverter systems

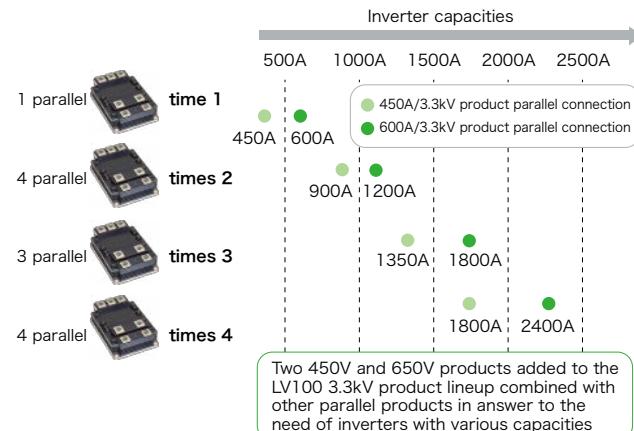
	LV100 Type	HV100 Type
1.7kV	1000A/1200A	
3.3kV	450A/600A	450A/600A
6.5kV		225A/300A

<Main Features>

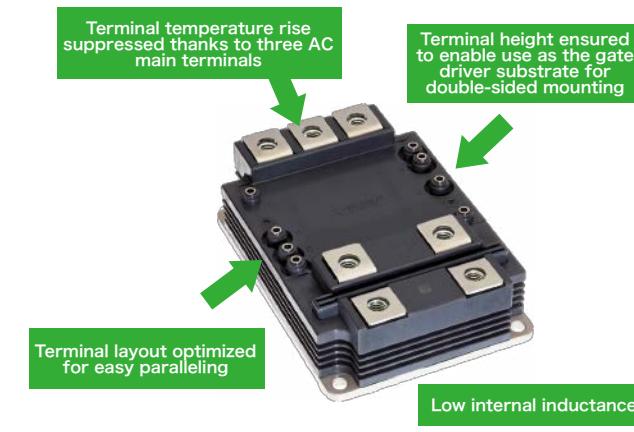
- Power loss reduced by incorporating 7th-generation IGBT and RFC¹ diode
- Industry's highest 3.3kV/600A Si module power density of 8.57A/cm²⁴ contributes to increased power output and efficiency
- Terminal layout optimized for easy paralleling and flexible inverter configurations and capacities
- New package structure offers extra reliability

⁴ As of Apr. 5, 2018, based on Mitsubishi Electric research

Various current ratings for optimal system design



Package features (LV100 type)



Line-up of HVIGBT Modules

■ Series Matrix of HVIGBT/HVIPM (No.: Number of outline drawing, see page 26 and 27)

V _{ces} I _{c(A)}	1700V				2500V				3300V				4500V				6500V						
	Model Number		Model Number		Model Number		Model Number		Model Number		Model Number		Model Number		Model Number		Model Number		Model Number				
Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.
200																				H	CM200HG-130H	H	D 07
225																				X	CM225DE-130XA**	D1	E 21
300																				X	CM300DE-130XA**	D1	E 21
400				H	CM400DY-50H	D1	B	15	H	CM400HG-66H	H	D	07						H	CM400HG-130H	H	D 12	
									H	CM400DY-66H	D1	B	15						H	CM400E2G-130H	E2	D 09	
450									X	CM450DA-66X**	D2	A	20										
									X	CM450DE-66X**	D2	E	21										
600	H	CM600DY-34H	D	B	01				X	CM600DA-66X**	D2	A	20						H	CM600HG-130H	H	D 11	
	H	CM600E2Y-34H	E2	B	01				X	CM600DE-66X**	D2	E	21	H	CM600HG-90H		H	D 12	X	CM600HG-130X**	H	D 18	
750																			R	CM750HG-130R	H	D 11	
800	N	CM800DZB-34N	D	C	01				H	CM800HB-50H	H	B	03	H	CM800HC-66H	H	C	03	R	CM800HC-90R	H	C 08	
	H	CM800DZ-34H	D	C	01				H	CM800E4C-66H	E4	C	06	R	CM800HG-90R	H	D	13					
	H	CM800HA-34H	H	B	-				H	CM800E6C-66H	E2	C	06						H	D 13			
900																		H	CM900HG-90H	H	C 09		
																		H	CM900HG-90H	H	D 13		
1000	X	CM1000DA-34X**	D2	A	20						R	CM1000HC-66R	H	C	08			H	CM1000HG-90X**	H	D 18		
										R	CM1000E4C-66R	E4	C	10				X	CM1000HG-130XA**	H	D 19		
1200	H	CM1200HC-34H	H	C	02				H	CM1200HC-66H	H	D	09										
	N	CM1200HCB-34N	H	C	03				H	CM1200HC-66H	H	C	06										
	N	CM1200E4C-34N	E4	C	05	H	CM1200HC-50H	H	C	06	X	CM1200HC-66X**	H	C	16	R	CM1200HC-90R	H	C 10				
	N	CM1200DC-34N	D1	C	04				H	CM1200E4C-66X**	E4	C	16	R	CM1200HC-90RA	H	C 10						
	S	CM1200DC-34S	D1	C	04				X	CM1200HCB-66X**	H	B	17	R	CM1200HG-90R	H	D 11						
	X	CM1200DA-34X**	D2	A	20						H	C	14										
1350																	X	CM1350HC-90X**	H	C 17			
																	X	CM1350HG-90X**	H	D 19			
1500											R	CM1500HC-66R	H	C	10	X	CM1500HC-90XA**	H	C 17				
										R	CM1500HG-66R	H	D	11	X	CM1500HG-90X**	H	D 19					
1600	H	CM1600HC-34H	H	C	02																		
	X	CM1600HC-34X**	H	C	16																		
1800	H	CM1800HC-34H	H	C	06						X	CM1800HC-66X**	H	C	17								
	N	CM1800HC-34N	H	C	05						X	CM1800HG-66X**	H	D	19								
2400	H	CM2400HC-34H	H	C	06																		
	X	CM2400HC-34X**	H	C	16																		
	N	CM2400HC-34N	H	C	05																		
	N	CM2400HCB-34N	H	C	06																		
	X	CM2400HCB-34X**	H	C	17																		
2400		CM3600HC-34X**	H	C	17																		

[Type] A: Al base plate / 6 kViso B: Cu base plate C: AlSiC base plate / 6 kViso D: AlSiC base plate / 10kViso E: Al base plate / 10kViso

★: Under Development

*There are possibility to change the type of auxiliary terminals.

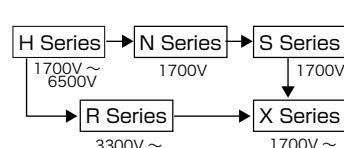
■ Series Matrix of HVDIODE Modules (No.: Number of outline drawing, see page 28)

V _{PRM} I _{f(A)}	1700V				3300V				4500V				6500V										
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.					
200													RM200DG-130S	D	D	24							
250													RM250DG-130F	D	D	24							
300									RM300DG-90S	D	D	24	RM300DG-130X**	D	D	24							
400				RM400DG-66S	D	D	24	RM400DY-66S	D	B	25	RM400DG-90F	D	D	24								
450													RM450DG-90X**	D	D	24							
600				RM600DY-66S	D	B	25	RM600HE-90S	H	C	23	RM600DG-130S	D	D	24								
800									RM800DG-90F	D	D	24											
900									RM900HC-90S	H	C	27											
									RM900DB-90S	D	B	27											
1000				RM1000DC-66F	D	C	26						RM1000DG-130XA**	D	D	24							
1200	RM1200DB-34S	D	B	22	RM1200DG-66S	D	D	24	RM1200HE-66S	H	C	23	RM1200DG-90F	D	D	24							
					RM1200DB-66S	D	B	27	RM1200DB-66S	D	B	27											
					RM1200DG-66X**	D	D	24															
1500				RM1500DC-66F	D	C	26																
1800	RM1800HE-34S	H	C	23																			

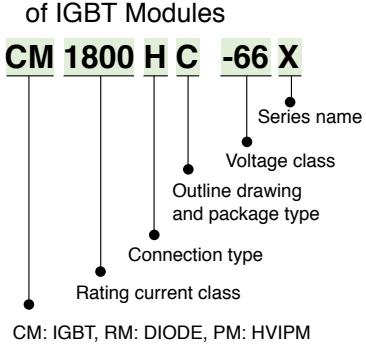
[Type] B: Cu base plate C: AlSiC base plate / 6 kViso D: AlSiC base plate / 10kViso

★: Under Development

■ Evolution of HVIGBT Module Series

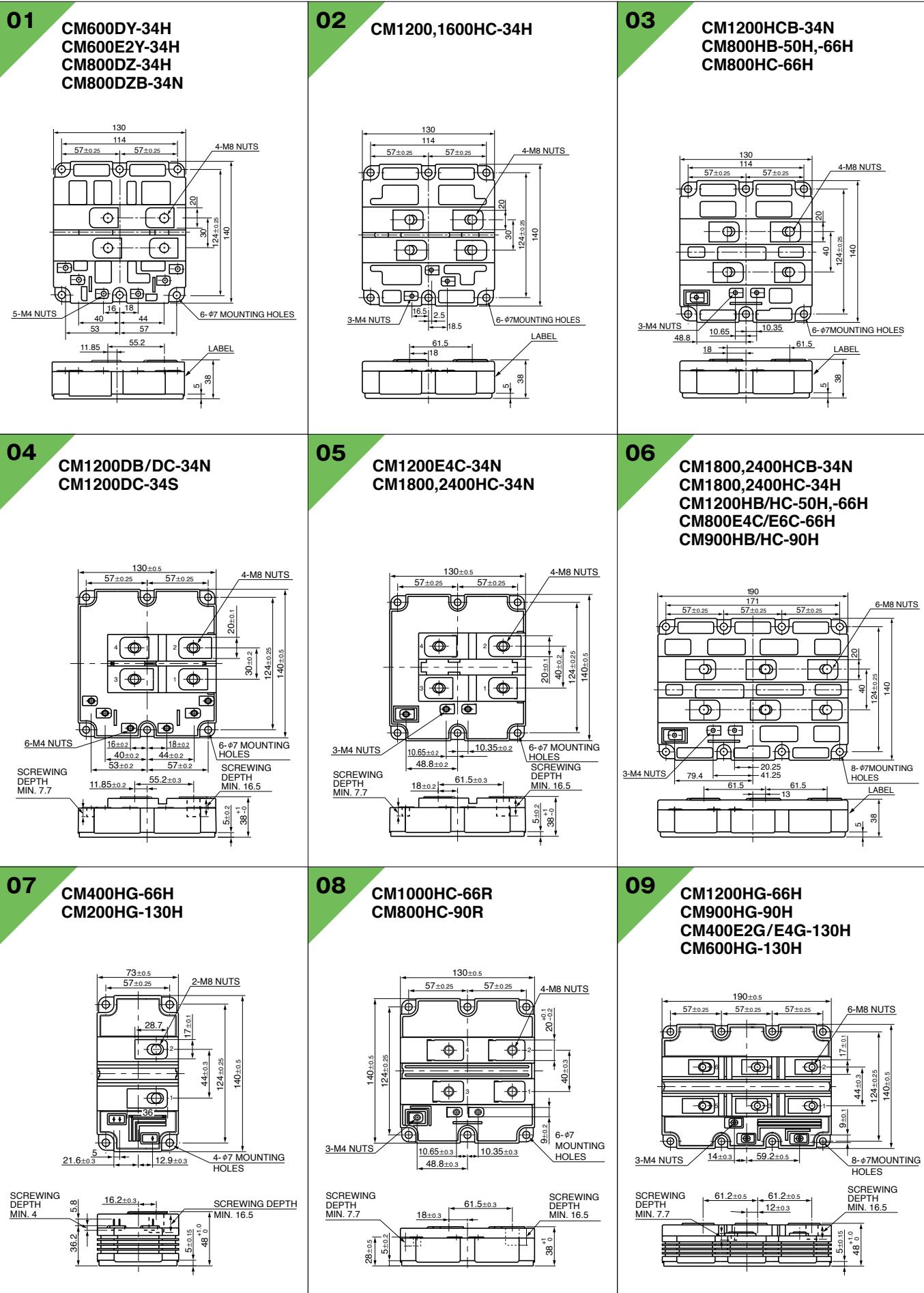


■ Type Name Definition of IGBT Modules



Outline Drawing of HVIGBT Modules

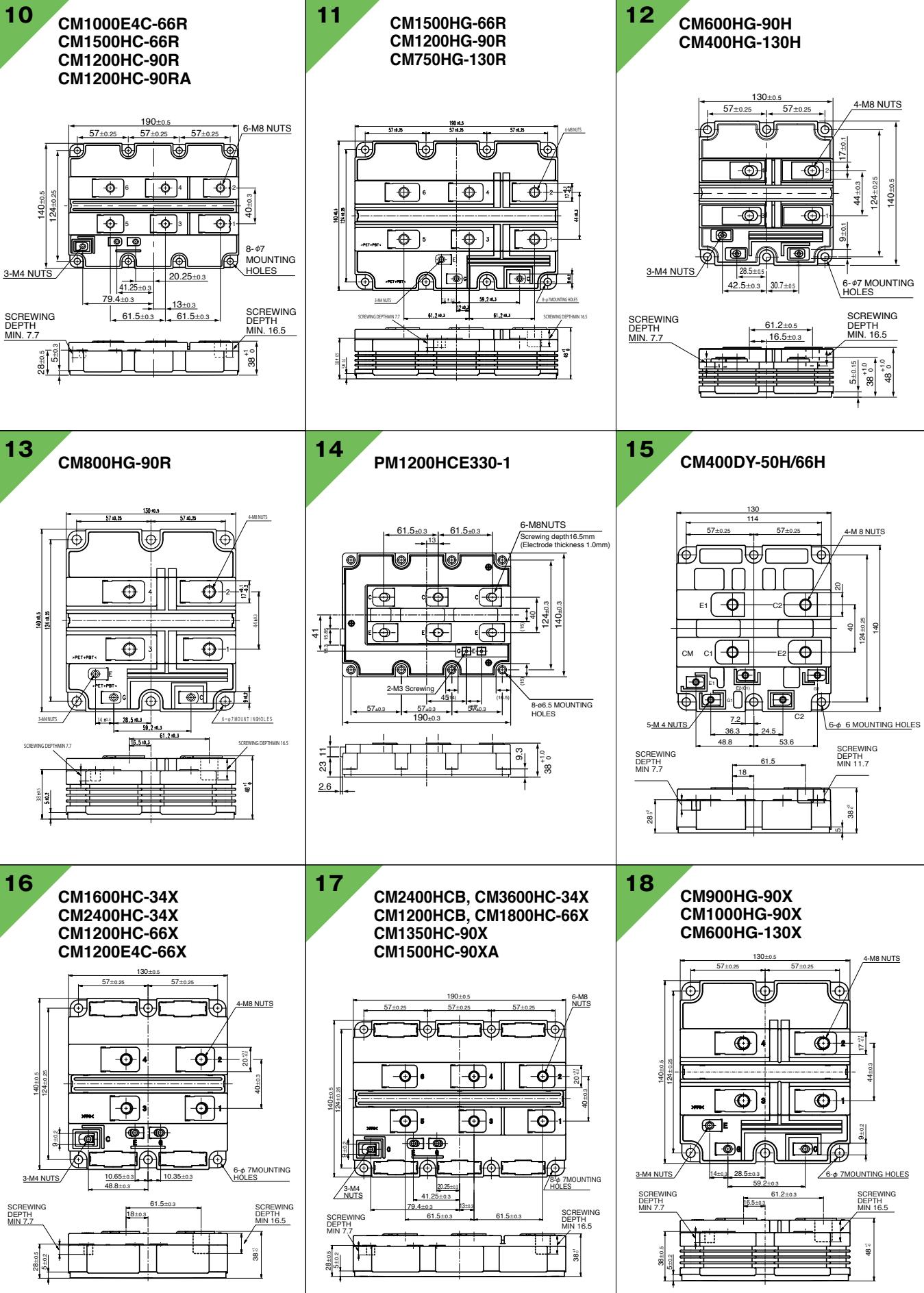
Unit:mm



Line-up of HVIGBT Modules

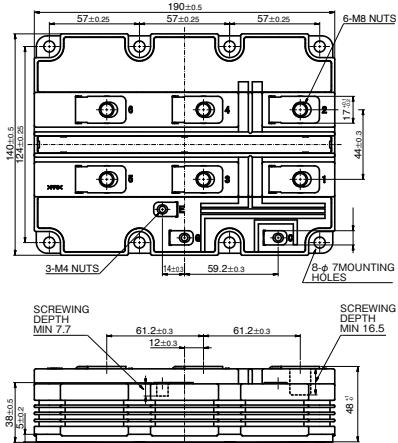
Outline Drawing of HVIGBT Modules

Unit:mm

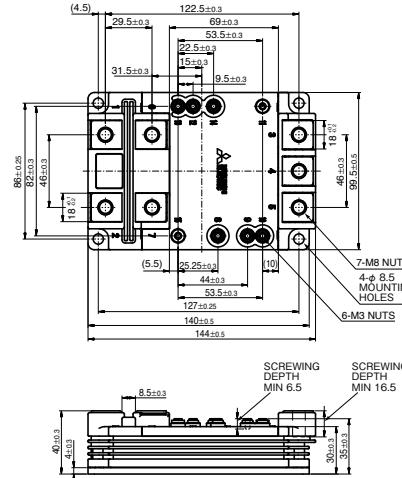


*There are possibility to change the type of auxiliary terminals.

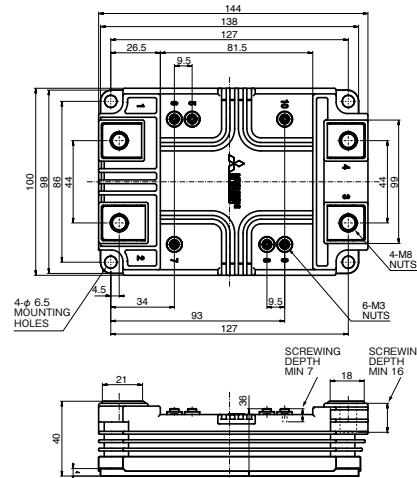
19 CM1800HG-66X, CM900HGB-90X
CM1350, 1500HG-90X
CM600HGB-130X
CM900HG-130X
CM1000HG-130XA



20 CM1000DA-34X
CM1200DA-34X
CM450DA-66X
CM600DA-66X



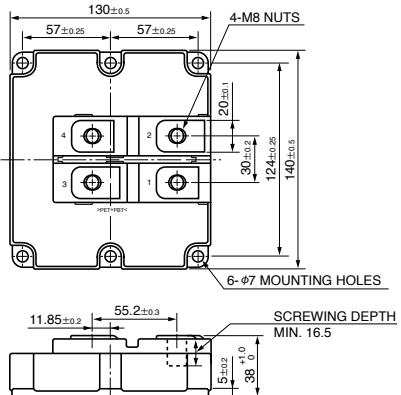
21 CM450DE-66X
CM600DE-66X
CM225DE-130XA
CM300DE-130XA



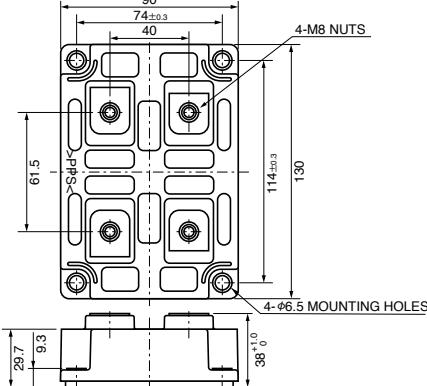
Outline Drawing of HVDIODE Modules

Unit:mm

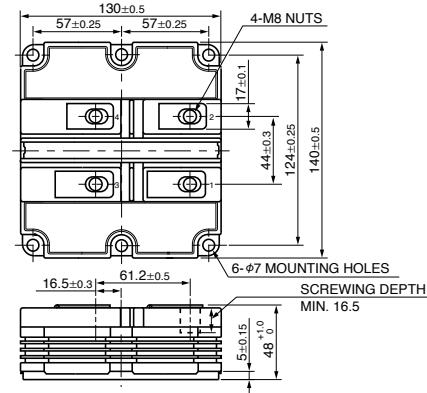
22 RM1200DB-34S



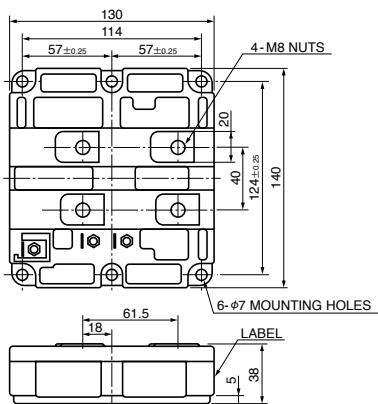
23 RM1800HE-34S
RM1200HE-66S
RM600HE-90S



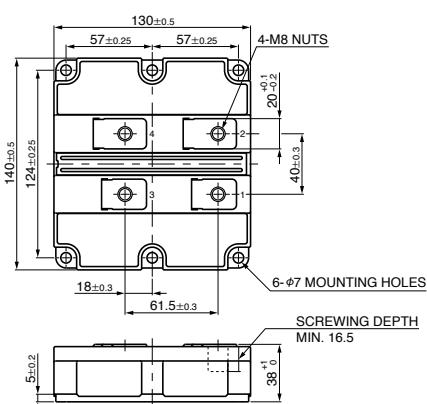
24 RM400,1200DG-66S
RM1200DG-66X
RM300DG-90S
RM400,800,1200DG-90F
RM450DG-90X
RM200,600DG-130S
RM300DG-130X
RM1000DG-130XA



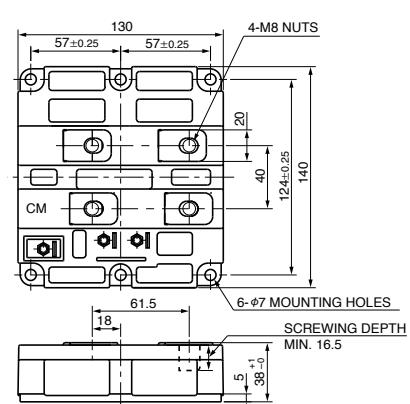
25 RM400,600DY-66S



26 RM1000,1500DC-66F



27 RM1200DB-66S
RM900DB/HC-90S

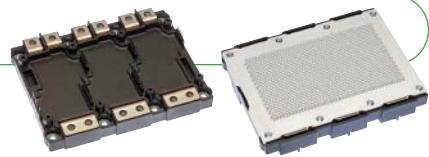


Power Modules for Electric and Hybrid Vehicles



New Products

Package with 6-in-1 connection and integrated water-cooled fin contributes to more compact, high-power inverters for EVs/HEVs



High Power J1 Series Power Modules for EVs/HEVs

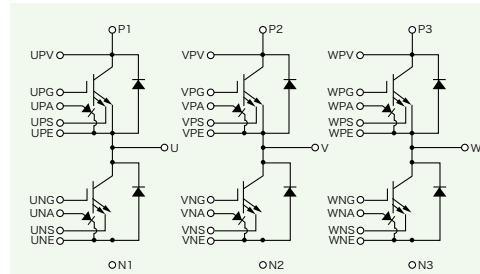
CT1000CJ1B060,
CT600CJ1B120

<Main Features>

- Integrated direct water-cooling structure with cooling fins and 6-in-1 connection contribute to more compact inverters for EVs/HEVs
- Direct lead bonding (DLB) structure ensures high reliability
- Loss further reduced by incorporating 7th-generation IGBT built with a CSTBT™* structure
- Completely lead-free, conforms to RoHS directives (2011/65/EU)
- Suitable for a variety of electric and hybrid vehicle inverters

*CSTBT™: Mitsubishi Electric's unique IGBT that utilizes the carrier cumulative effect.

Block Diagram



Features

Common

- Long power/temperature cycle life
- High-precision on-chip temperature sensor
- High traceability in managing materials/components for each product throughout the entire production process

- Package structure compliant with the End-of-Life-Vehicles Directive, regulations relating to substances of environmental concern

J Series T-PM (Transfer-molded Power Module)

- Structure incorporates transfer molding and original direct lead bonding (DLB) technique
- DLB structure reduces internal wiring resistance and inductance
- Completely Pb-free (including the pins)

J1 Series (6-in-1)

- Cooling fin integrated direct water-cooled structure and 6-in-1 configuration contribute to minimize the automobile inverter
- DLB structure realizes high reliability
- Installation of the 7th generation IGBT adapting the CSTBT™* structure realizes a further reduction in loss
- On-chip current sensor that enables high-speed current-cutoff protection is installed

Matrix of 650V Power Modules (No. : Number of outline drawing, please refer to page 30)

V _{CES} (V)	650V						
	Series	J1 Series		J Series			
I _C (A)		Power Module with pin fin	Connection	No.	T-PM	Connection	
300		-	-	-	CT300DJG060**	D 02	
600		CT600CJ1A060	C 01		CT600DJH060**	D 03	
700		CT700CJ1A060*	C 01		-	-	
1000		CT1000CJ1B060*	C 04		-	-	
Connection		C			D		

★: New Product ★★: Under Development

Matrix of 1200V Power Modules

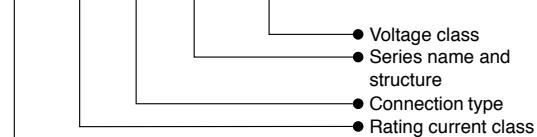
(No. : Number of Outline Drawing, please refer to page 30)

V _{CES} (V)	1200V			
	Series	J1 Series		
I _C (A)		Power Module with pin fin	Connection	
300		CT300CJ1A120**	C 01	
600		CT600CJ1B120*	C 04	
Connection		C		

★: New Product ★★: Under Development

Type Name Definition of Power Modules for Electric and Hybrid Vehicles

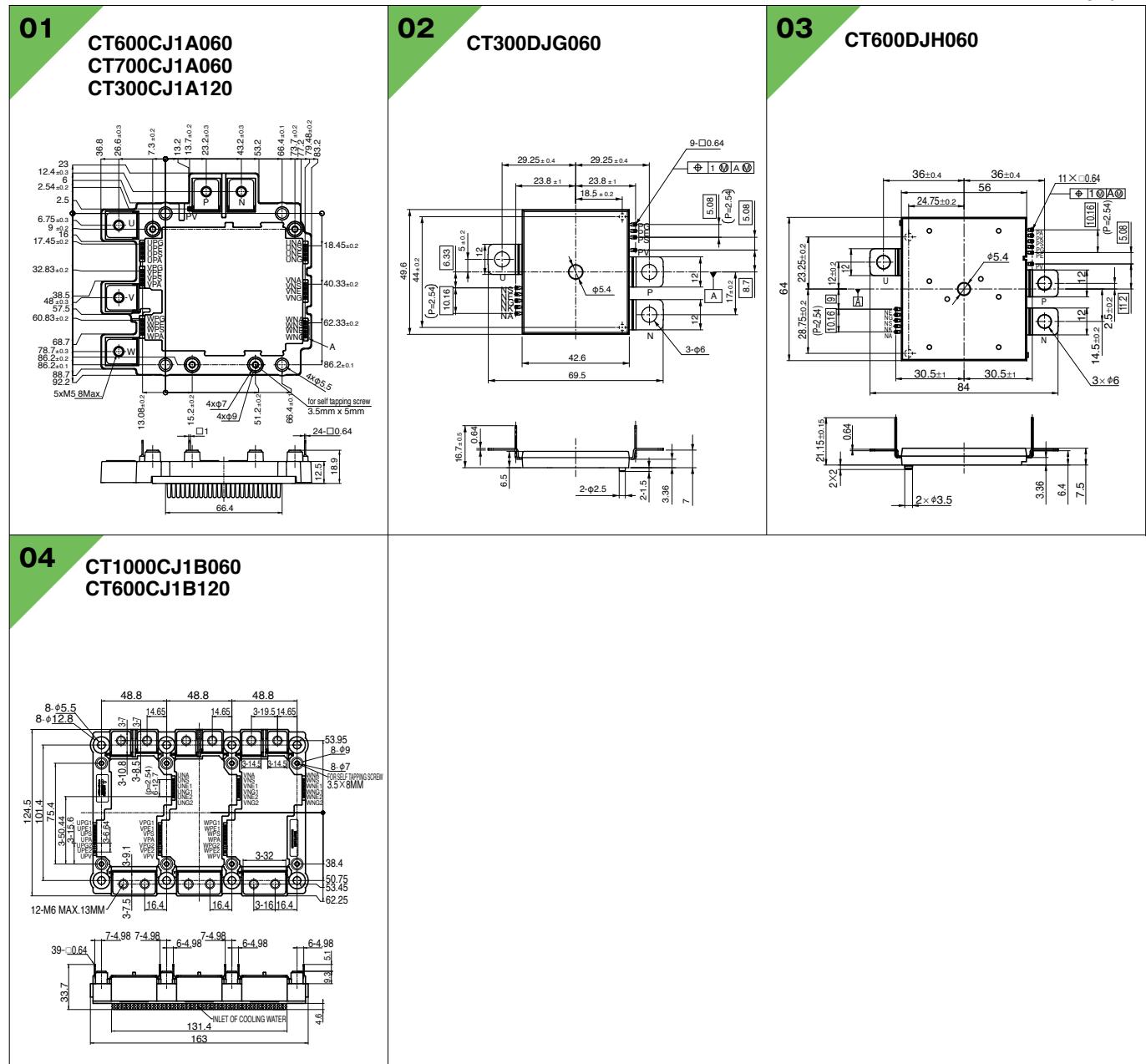
CT 600 C J1B 120



- Voltage class
- Series name and structure
- Connection type
- Rating current class
- CT: IGBT

■ Outline Drawing of Power Modules for Electric and Hybrid Vehicles

Unit:mm



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